

# UNITED STATES NAVY

## Medical News Letter

Vol. 48

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No. 10

### Surgeons General of the Past

(The first in a series of brief biographies)

William Paul Crillon Barton, the first Chief of the Bureau of Medicine and Surgery was born in Philadelphia, Pa., on 17 November 1786. His father, a lawyer, designed the United States Seal, and his brother designed the Barton Bandage.

He graduated from Princeton in 1805, received his medical degree from the University of Pennsylvania in 1808, was commissioned in the United States Navy in 1809, and became Chief of the Bureau of Medicine and Surgery in 1842. Although he was the first Chief of the Bureau he was not the first Surgeon General, as that title was not established until 1871.

In 1814, Dr. Barton published his *Treatise Containing a Plan for the Internal Organization and Government of Marine Hospitals in the United States, together with a Scheme for Amending and Systematizing the Medical Department of the Navy*. Many of the proposals he made in this book were adopted years later. From 1815 onwards he was Professor of Botany at the University of Pennsylvania.

Among Dr. Barton's many accomplishments as Chief of the Bureau, the following are worthy of note:

- (1) He was an early advocate of increasing sick bay spaces aboard ship, and proposed higher physical standards for naval recruits.
- (2) He standardized medical supplies and equipment.
- (3) He was responsible for placing a medical library in each naval medical unit.
- (4) He is considered the father of our naval hospitals.
- (5) He recognized the value of antiscorbutics in various foods and drinks in curbing the then widespread disease of scurvy among sailors.

He died in 1846 and is buried in Laurel Hill Cemetery at Philadelphia.



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The issuance of this publication approved by the Secretary of the Navy on 4 May 1964.



## CIRRHOSIS OF THE LIVER: FATALITIES FOLLOWING SURGICAL PORTAL DECOMPRESSION

*Eddy D. Palmer MD, Chief, Gastroenterology Section, Veterans Administration Hospital, East Orange, New Jersey. From the Gastroenterology Section, Veterans Administration Hospital, East Orange, New Jersey 07019. Amer J Med Sci 251(4): 35/377-38/380, April 1966.*

Cirrhotic patients who have been treated for esophageal varices by surgical portal decompression comprise an important and interesting group for study. Not only should successful elimination of varices remove a major threat to the cirrhotic patient's existence, but also this is a carefully selected group of patients to begin with, and ordinarily it is closely followed and studied thereafter, with eventual study at necropsy. Current controversy over advisability of portal decompression for cirrhotic patients with varices will be settled only after a good deal of information is gathered, and observations on what shunted patients die of will prove especially important.

This paper deals with the causes of death among 94 cirrhotic patients who were treated by portal decompression and who were personally followed to the time of death. The study was a prospective one, initiated at Walter Reed General Hospital, Washington D. C., in 1950.

**Patient Material.** The 94 patients included 14 women, and at the time of death the number of patients per age decade, from the second through the eighth decades, were respectively 1, 6, 18, 30, 28, 10, and 1. The oldest patient was 76 at the time of shunt and 79 at death. Ninety-two of the patients were examined at necropsy.

The initial operation had been portacaval shunt in 85 instances, splenorenal shunt in 8, and splenocaval shunt in one. One of the splenorenal shunt patients had had a portacaval shunt 26 months after the first operation because of recurrent varices and bleeding.

The chronology of the deaths in relation to surgery is shown in Table 1. The 22 deaths that occurred during the first postoperative month are considered here to be the result of surgery and are dealt with separately from the rest. It must be understood, of course, that effectiveness of shunt surgery and survival thereafter are not concerns of this paper.

Table 1

Postoperative Survival Time of 94 Patients Who Died Following Portal Decompression	
Interval Following Surgery	No. Deaths
First postop. month	22
1-6 mos.	13
6-12 mos.	7
1-2 yrs.	12
2-3 yrs.	13
3-4 yrs.	4
4-5 yrs.	4
5-6 yrs.	3
6-7 yrs.	4
7-8 yrs.	6
8-9 yrs.	2
9-10 yrs.	2
10-11 yrs.	2

"Liver failure" as used here means metabolic failure, with coma, fever, and rapidly increasing jaundice, leading soon to renal failure and often hemostatic failure, and death. The other forms of liver failure: failure of fluid regulation, pigment excretion, nutrition, portal venous flow, and others, are not being evaluated.

### Deaths Secondary to the Surgery

Causes of the 22 deaths that occurred during the first post-shunt month are shown in Table 2. Liver failure that was apparently induced simply by the stress of the operation was, as expected, the largest category. Some of the patients who died of liver failure did so on the third to fifth postoperative day, but in others the complication developed insidiously and progressed slowly, with death intervening only 3 or 4 weeks later. The most significant observation made on this group was that it included several

Table 2

Causes of Death During First Post-Shunt Month (All Patients Examined at Necropsy)	
	Patients
Liver failure, without bleeding or infection	9
Pneumonia and atelectasis	2
Liver failure secondary to hemoperitoneum	1
Exsanguination into peritoneal cavity	1
Acute congestive cardiac failure	1
Renal failure, without liver failure	1
Hyperkalemia with renal failure	1
Subphrenic abscess	1
Gram-negative septicemia	1
Sudden death, unexplained	4

patients whose preoperative liver evaluation labeled them as "excellent risk" surgical candidates, as will be discussed below.

The cause in 2 patients was postsurgical intra-peritoneal hemorrhage. One of the 2 died quickly of exsanguination. The other died of liver failure 2

weeks after immediate re-operation and ligation of a torn omental vein. It was not thought in either case that chronic or precipitous failure of the hemostatic mechanism was involved, although the potential threat of this form of liver insufficiency among shunted patients is not being denied.

Cirrhotic patients have the reputation of being particularly susceptible to infection, but there were only 4 fatal instances during the first postoperative month: 2 cases of pneumonia, one of subphrenic abscess, and one of septicemia with a Gram-negative bacillus.

Four patients who were getting along well following operation died suddenly during the first post-operative week. These were mysterious deaths, unexplained clinically and still unexplained at necropsy.

#### Deaths After the First Postoperative Month

The causes of these 72 deaths are shown in Table 3. Seven patients died as a result of variceal bleeding: 2 by exsanguination and 5 of liver failure initiated by variceal bleeding. Four of the seven patients had been treated by splenorenal shunt, 3 by

Table 3

Causes of Death After First Post-Shunt Month (70 of the 72 Patients Examined At Necropsy)	
	Patients
Liver failure, without bleeding or infection	32
due to variceal bleeding (shunt closed)	5
due to duodenal ulcer bleeding	2
due to esophagitis bleeding	2
due to Mallory-Weiss bleeding	1
due to bleeding, source undertermined	1
due to gastric ulcer perforation	1
due to acute pancreatitis	1
Exsanguination, from duodenal ulcer	4
from varices (shunt closed)	2
from gastric ulcer	1
Peritonitis, following total colectomy	1
following small bowel infarction and resection	1
Shock following surgery for strangulated umbilical hernia	1
Cerebral hemorrhage	2
Hypertensive cardiovascular disease	2
Myocardial infarction	2
Pericarditis and pneumonia	1
Subacute bacterial endocarditis and lung abscess	1
Gram-negative septicemia	1
Hepatoma	5
Carcinoma of esophagus	1
Malignant melanoma	1
Suicide	1



portacaval shunt. Therefore, of the 8 patients who died following splenorenal shunt, 4 died of variceal bleeding and a fifth had required a second shunt procedure because of recurrence of varices and bleeding.

Upper gastrointestinal bleeding of nonvariceal origin was involved in 11 deaths. In 7 the bleeding was from gastric or duodenal ulcer. Ulcer hemorrhage, then, caused or initiated almost 10% of the deaths and, in addition, another death followed ulcer perforation.

Liver failure was considered to be the immediate cause of death in 45 patients, or 63% of the group. In 32 instances, liver failure came on spontaneously without a recognized triggering event. Some of the patients had been in and out of hepatic decompensation a few times since surgery and others had been strong and vigorous until the terminal episode.

Three patients died following emergency major bowel surgery. One required total colectomy for torrential hemorrhage due to fulminant ulcerative colitis, another developed a strangulated umbilical hernia, and a third required resection of most of the small bowel following mesenteric arteriovenous occlusion.

Although it is often said that cirrhotic patients seem protected against arteriosclerotic problems and hypertension, 2 of this group died of stroke, 2 of myocardial infarction and 2 of hypertensive heart disease.

Hepatoma was the cause of death in 5 instances, and necropsy turned up one other small hepatoma as an incidental finding. There were 2 other cancer deaths.

#### Situational Analysis

Of special importance for eventual evaluation of the usefulness of surgical portal decompression is

arrangement of the figures according to the factors responsible for initiating the terminal event. This simple form of situational analysis is presented in Table 4.

The analysis shows that approximately one-third of the deaths can be blamed on the shunt surgery, approximately one-third were due to the cirrhosis *per se*, and the rest were due either to liver disease that cannot be controlled or altered (hepatoma) or to causes unrelated to the liver disease.

#### Comment

One of the early lessons of portacaval shunt experience was that often the "good risk" surgical candidate (young, vigorous, new cirrhosis, good liver function, excellent nutrition, and others) fared less well following shunt than did the "poor risk" patient (wasted, long-standing cirrhosis, ascites, very abnormal liver function, and others). Often the former patients went into hepatic coma and died within a week of surgery, while the latter seemed hardly to react to the operation at all and lived for years thereafter.

This paradox, and it is quite an unpredictable one, is thought to be due to the extent to which the liver has been dependent on portal vein blood flow preoperatively. Observations at surgery on differential portal venous pressures, measured when the portal vein is clamped on one and then the other side of the measuring needle, indicate that the new cirrhotic patient quite regularly uses his portal vein as an inflow tract. For him, sudden diversion of the portal flow away from the liver seems to create a serious immediate problem for the liver.

On the other hand, measurements in the long-standing cirrhotic patient suggest that often this "poor risk" individual is using his portal vein merely as one of the venous outflow tracts from the liver.

Table 4

#### Situational Explanations for Deaths, 94 Post-Shunt Patients

Deaths that can be blamed on shunt surgery:

	Patients
Death due to the immediate effects of the operation	22
Death due to failure of the operation to achieve or maintain portal decompression	7
Deaths in spite of successful shunt surgery:	
Remote cause of death was not related to the liver disease	28
Remote cause of death was the liver disease:	
Hepatoma	5
Cirrhosis <i>per se</i>	32

Perhaps his liver has not been using blood from the portal vein for years, although it is surely hazardous to generalize about a dynamic vascular system on the basis of single measurements made under artificial conditions. At any rate, sudden interruption of the vein seems to be relatively well tolerated by the liver that is diseased with advanced cirrhosis.

After the first postoperative month had passed, liver failure, of course, continued to be the main threat. Death due to bleeding from varices, secondary to shunt closure, was gratifyingly infrequent. Gastroduodenal ulcer maintained its bad reputation as a spoiler of successful decompressive surgery.

#### Summary

Ninety-four cirrhotic patients treated by surgical

portal decompression were followed to the time of death, in a prospective study. Twenty-two died during the first postoperative month, the immediate cause in 10 being liver failure.

After the first month, liver failure proved the immediate cause of death in 63% of the cases. Seven patients died as a result of variceal bleeding, and necropsy revealed closure of the shunt in all. Of 8 patients who died following splenorenal shunt, 4 died of variceal bleeding. Gastroduodenal ulcer was the immediate or remote cause of death in 8 instances.

Altogether approximately one-third of the deaths could be blamed on the shunt surgery, one-third on the cirrhosis *per se*, and the rest on either hepatoma or causes unrelated to the liver disease.

## PATIENT PROTECTION IN CANCER CHEMOTHERAPY

Stanley A. Schwartz MD and Seymour Perry MD. *JAMA* 197(8): 105-109, August 22, 1966.

Eight patients undergoing intensive cancer chemotherapy have been treated in a protection unit. The antibiotic protocol in this program was designed to prevent the appearance of resistant organisms. The preliminary results indicate that it is quite feasible and practical to maintain an individual in a relatively germ-free environment for long periods of time. In this small group of patients there was no evidence of infection with the more common pathogens, despite severe bone marrow depression and leukopenia induced by anti-tumor agents.

Toxicity in cancer chemotherapy is often the limiting factor governing the amount of drug which can be given. Bone marrow depression predisposing to hemorrhage and infection, and effects on the gastrointestinal tract resulting in diarrhea, nausea, and vomiting lead to a cessation of therapy in many cases before an adequate quantity of drug can be given. Hemorrhagic complications have been reduced by the increasing and more effective use of platelet transfusions. However, infection is still a major cause of death in patients with leukemia and solid tumors despite new and more potent antibiotics.

In an effort to decrease the incidence of infection, practical reverse isolation units have recently been under development. With this approach, infections associated with extensive burns and with major sur-

gical procedures have been reduced. A reverse isolation unit has been in use for about a year at the National Cancer Institute for the treatment of certain patients with malignancy (Fig. 1). The rationale for employing this technique is that by isolating the patient during maximal bone marrow suppression, hazards of infection may be avoided and maximum amounts of cancer chemotherapy can be given. Previous studies have suggested that germ-free animals

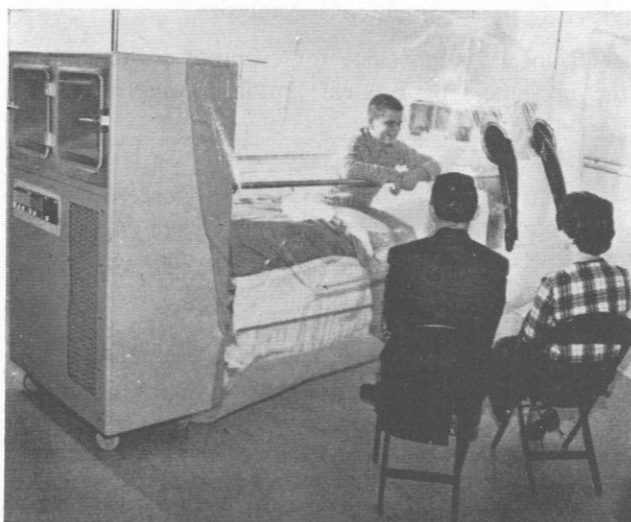


Fig. 1. Side view of reverse isolation unit.

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can tolerate increased amounts of chemotherapy and radiotherapy with a reduced incidence of infection. The purpose of this paper is to describe the procedures for reverse isolation and to report the results in the first cases treated at the National Institutes of Health.

# Materials and Methods

Individuals with leukemia and solid tumors were considered for the study either because (1) toxicity had precluded maximum cancer chemotherapy, or (2) from previous experience, the chemotherapy contemplated would have resulted in prolonged bone marrow suppression, gastrointestinal toxicity, and increased susceptibility to infection.

Prior to the entrance of a patient into the isolation unit, the physician, nurse, dietician, social service worker, physiatrist, and occupational therapist involved discussed problems that might arise while the particular patient was in the unit.

The patient was then prepared for entrance into the unit. Baseline cultures of anterior nares, skin, posterior pharynx, and stool were obtained. While in the unit nose, throat, skin, and stool cultures were obtained at least twice a week. In this pilot study only aerobic cultures were made with semiquantitative bacterial counts. Air from the unit was sampled daily and quantitative bacterial counts were carried out with a modification of the Fort Dietrich Slit-Incubator Sampler (NIH Instrument Section drawing 1256-P1-4).

Table 1.—Antibiotic Protocol \*

Solution	Constituents	Dosage †	Days Administered
A	Bacitracin ‡	15,000 $\mu$ /M <sup>2</sup>	Day 1-4
	Phthalylsulfathiazole	0.75 gm/M <sup>2</sup>	
	Neomycin sulfate	0.5 gm/M <sup>2</sup>	
B §	Bacitracin	15,000 $\mu$ /M <sup>2</sup>	Day 5-8
	Polymyxin B sulfate	12.5 mg/M <sup>2</sup>	
	Neomycin sulfate ‡	0.5 gm/M <sup>2</sup>	
C	Kanamycin sulfate	0.5 gm/M <sup>2</sup>	Day 9-14
	Paramomycin sulfate	0.25 gm/M <sup>2</sup>	
	Nystatin §	250,000 $\mu$ /M <sup>2</sup>	

\* Nasopharyngeal and anterior nares sterilization.

† All doses given four times daily.

‡ Dose: bacitracin, 5,000 $\mu$ /cc; neomycin, 300 mg/60 ml; nystatin, 10,000 $\mu$ /cc.

§ Triple-antibiotic cream containing neomycin, bacitracin, and polymyxin applied four times daily to the anterior nares.

Three days before the patient entered isolation, hexachlorophene (pHisoHex) shower baths were given twice daily. After each shower the patient put on fresh sterile pajamas and fresh sterile sheets were used on the bed. The patient was also given 15 to 30 ml of castor oil, and the following morning, a high soap-suds enema. At this time the antibiotic regimen was started (Table 1). Twenty-four hours before the patient entered the unit, it was sterilized with a 2% peracetic acid solution. The patient then took another hexachlorophene shower the morning of admission to isolation. While in isolation, antibiotics and the daily hexachlorophene washings were continued.

Table 2.—Bacterial Infection and Fever in the Isolation Unit

Parameter	Days
Total patient experience in unit	218
Bacterial count in the unit below minimum of a ventilated hospital room	215
Bacterial count 10 times less than minimum of a ventilated hospital room	161
Documented infection	8
Febrile days	30
Positive stool cultures after first course of antibiotic therapy	40 of 100
Positive bacterial cultures of skin	20 of 100
Positive bacterial cultures of anterior nares	8 of 100
Positive bacterial cultures of throat	95 of 100
Total granulocyte count below 1,500/cu mm	132

Canned food was used almost exclusively. The cans were prewrapped and gas-sterilized with ethylene oxide. They were then passed into the unit under sterile conditions, opened, and placed on sterile plates. All materials used by the patient were gas-sterilized. These included items such as toothbrushes, toothpaste, razor and blades, books, and newspapers. Instruments used by the physician, e.g., tuning forks, stethoscope head, percussion hammer, ophthalmoscope, and electrocardiographic leads were also presterilized and stored in the unit. Parenteral drug administration, bone marrow examinations, peripheral blood samplings, and cultures were conducted without breaching isolation conditions.

When cancer chemotherapy was concluded and the total granulocyte count was above 1,500/cu mm, the patient was started on fresh yoghurt. Antibiotics were continued for an additional two days and after this the routine hospital diet was begun. The patient was then released from the unit.

## Results

Eight patients have been treated in the isolation unit, but only six have completed the course. As shown in Table 2, a total of 218 patient days have been evaluated. In this period of time there were only three days when bacterial counts were approximately those of a well-ventilated hospital room at NIH where they average 100 colonies/100 cu ft of air. On 161 of those days the total bacterial count was tenfold less. There was one instance of infection despite the fact that the total granulocyte counts were below 1,500/cu mm during 132 of those days. The one infection occurred in a patient with choriocarcinoma who developed shortness of breath and a pulmonary infiltrate after 30 days in the unit. On sputum culture, a cytomegalovirus was found.

There were 30 patient days of fever (oral temperature about 100.4F [38C]). However, only in the case described was a documented cause found while the patient was in reverse isolation.

Suppression of bacterial flora was evident, particularly in the gastrointestinal tract. Stool cultures showed evidence of bacterial suppression after five to seven days of therapy. However, 40 of 100 cultures obtained after this period of time revealed bacteria or fungi, but the number of colonies were generally few. Malabsorption studies were not carried out, but stools were semi-solid and odor free. Cultures from axillae were positive in 20 of 100 studies. Most of these positive cultures occurred in the first case. The predominant organism was *Staphylococcus Albus*. This organism also appeared on occasion in stool cultures. Although bacteria were quantitatively decreased in the throat, 95 of 100 throat cultures remained positive for mixed flora. Oral ulcerations were markedly reduced despite large doses of antitumor drugs.

## Comment

From this preliminary study it appears that it is feasible and practical to maintain an individual in a virtually germ-free environment for long periods. A controlled study would be difficult to perform, but in this small group of patients there was no evidence of infection with the more common pathogens, despite severe bone marrow depression and leukopenia induced by antitumor agents.

The antibiotics used for bowel antisepsis in this study have been employed singly or in combination in the past and have been shown to be effective. The antibiotic protocol was designed to prevent the appearance of resistant organisms.

The importance of intestinal antisepsis in the conventional as well as in axenic mice has been demonstrated in animals given whole body radiation. They were able to tolerate greater amounts of radiation without evidence of infection at post-mortem examination. The same effect has been reported in germ-free and conventional animals treated with a nitrogen mustard. The delayed lethal toxicity of the nitrogen mustard occurred with less frequency in the axenic group.

An explanation for these findings is that reduction of toxicity is related to the absence of bacteria or bacterial endotoxins. Both fluorouracil and methotrexate cause gastrointestinal toxicity, probably due to the interference with the mitosis of rapidly growing cells. This results in superficial ulcerations in the mouth as well as in the small and large bowel. Of interest, in relation to this, is the work of Abrams and his associates who demonstrated the slower turnover of cells in the ileum of rats which were bacteria-free when compared to their conventional counterparts. These authors suggested that living bacteria may act to accelerate the turnover of cells of the gastrointestinal mucosa, and suggested that the presence of living organisms may result in a marked reduction of the total cells in the ileum. By reducing the normal flow, gastrointestinal toxicity from chemotherapeutic agents could be reduced.

Other areas of the body have also been shown to be reservoirs of bacteria. Even though the incidence of staphylococcal infection has been decreased in the patient population in our ward, it was considered important to treat the skin and anterior nares. The persistence of skin organisms was of significance in the present study as shown by the fact that when bacteria did appear in the air of the isolation unit, their incidence was correlated with movement of the patient or changing of the bed sheets. Presumably, the organisms on the sheets originated from the skin.

The attempt to suppress intestinal bacterial flora appears to have been successful, judging from the results of the aerobic cultures. Anaerobic cultures only recently became part of the routine procedure and these have produced no growth. Persistent positive skin and throat cultures indicate that the antiseptic program directed at these areas has not been totally effective. The skin may harbor organisms below the surface which are not always accessible to the effects of daily hexachlorophene baths. In the throat, the antibiotics delivered by spray exert their effects transiently, being washed away by saliva. However, despite some bacteria remaining in the throat and mouth, stomal ulcers have been reduced.



The continuous monitoring of the air supply in the reverse isolation unit has demonstrated a marked diminution in bacterial counts. When bacterial counts in the room were compared to those in the unit, there were 1,000- to 1,500-fold less in the latter. There have been days when no organisms have been found.

Patient protection by isolation offers important potential aids to intensive cancer chemotherapy. In the few cases evaluated in the present series, a greater amount of chemotherapy per period of time has been given with equivalent or decreased toxicity compared to previous experience. In addition, the interval be-

tween courses of chemotherapy has been shortened. If increased drug doses and duration of administration enhance the effectiveness of cancer chemotherapy, isolation may improve the testing of this hypothesis.

Emil Frei III MD, now with the University of Texas, Anderson Hospital, Houston, was instrumental in procuring the first reverse isolation unit at the National Cancer Institute and was involved in the early phases of the study.

(The references, figures and case reports may be seen in the original article.)

## COMPLICATED RHEUMATOID DISEASE\*

*F. Dudley Hart\*\**, MD FRCP, *Brit Med J* 2(5506): 131-135, July 16, 1966.

Rheumatoid arthritis is a disease not only of bone, ligament, and joint, but also of the patient as a whole. It has not only articular manifestations, but general ones also, so that loss of weight, anaemia, and low-grade ill-health are very much a part of the clinical picture. How often have we heard a patient say, "My arthritis is better than it was, doctor, but I feel worse in myself," or vice versa. Along with this prolonged disorder of body goes, inevitably, psychic (or spiritual) distress. A prolonged painful illness will find the weak spots in anyone's psychic armour, so that depression and anxiety are an everyday and regular part of the disease in many, if not most, cases. Suffering may occasionally make saints; more often it makes tense short-tempered sinners.

Grace Stuart, herself a sufferer from rheumatoid arthritis, in her book *The Private World of Pain* quotes the late Reverend Dick Sheppard as saying to Laurence Housman, "I like pain: it brings me nearer to my Master." But later, racked with more severe and continuous pain, he wrote in a moment of despondency to his friend, "I do not love suffering, so you must not worry about me in that way. I dislike all that talk about how lovely it is to suffer. I think it is a rotten process which has nothing whatsoever to do with God. . . . I know it may do me good—that is, if I take it decently, but I know it is as likely to embitter mankind as to convert him." And Somerset Maugham: "I know that suffering did not ennoble, it degraded. It made men selfish, mean, petty, and suspicious. It absorbed

them in small things. It did not make them more than men; it made them less than men." Nevertheless, after 20 years of close contact with the rheumatoid sufferer, I have seen many more saints than sinners emerge from their suffering, and I am daily amazed at the fortitude with which these patients accept their daily painful and unpleasant lot. This, then, is our first aspect of the complicated picture of rheumatoid arthritis; the patient's emotional reaction to a prolonged, painful, and at times seemingly hopelessly progressive disease.

The physician who sets out to treat this condition must put time aside to deal with the patient's individual problems and must blend sympathy and practical and timely advice with intelligent use of analgesics and occasionally psychotropic drugs. In many patients this aspect is the greater one and the more important. I have said on many occasions previously that therapy in rheumatoid arthritis is not so much a treatment as a way of life. The sufferer may often be lucky and have a natural remission from disease activity, but equally often she continues to have daily pain, weakness, and stiffness for many years. Almost all this time is spent at home, the patient and her disease being far from physician and physiotherapist. She is alone with her arthritis in her private world of pain. Over 90% of a rheumatoid sufferer's life is touched only by her physician's advice and his drugs, and in some cases by the results of orthopaedic surgery. There have been a hundred cures for rheumatoid arthritis; there are, in fact, none. But there are today many ways of controlling symptoms which were unknown to our

\* The Edgecombe Lecture given at the Harrogate Medical Society on 16 March 1966.

\*\* Consulting Physician, Chelsea Hospital for Women, London.

predecessors, and Nature will sometimes effect a cure if we give her the chance by reasonable, sane, and unbiased advice.

### The Rheumatoid Nodule

The rheumatoid nodule is not a complication, but is the characteristic basic lesion, the gumma as it were of the disorder, and when nodules are present the sheep-cell-agglutination test is almost invariably positive in high titre. Nodular rheumatoid disease is usually the classical more severe form, more prone to the complications under discussion, and carrying a more serious prognosis than non-nodular disease. But the nodules themselves lead to trouble, for they may break down and become infected, leading to chronic ulcers and sinuses; and as they occur typically over the bony points pelvic and spinal pressure-points may be involved, creating a difficult nursing problem in the bed- or chair-fast patient. These nodules, when they occur below the elbow, may cause periosteal changes visible in x-ray films (Kreel and Urquhart, 1963), and may be an inconvenience to the patient if they break down and become ulcerated, but they are of slight inconvenience as compared with buttock or sacral nodules. These may range in size from an orange pip to the orange itself, and if they break down may lead to deep sloughs and large raw areas which call for skin-grafting. Such chronic ulcers over pressure-points of the pelvis may become chronically infected and contribute to a fatal outcome.

Surgery should be minimal, apart from debridement and grafting, as the areas often heal poorly. Nodules over the ears and shoulders may prevent sleep because of pain from pressure on pillows. Wherever it may be, a rheumatoid nodule may break down. This may be in response to local trauma or may occur spontaneously; sometimes two or more nodules may break down at the same time, suggesting a general systemic effect. Vaughan-Jackson (1962) has drawn attention to attrition ruptures of extensor tendons of the hands, the tendon sawing itself in two by friction on ulnar styloid process; but nodules may occur in tendons and rupture well away from any point of attrition.

Some patients suffering from severe classical rheumatoid disease with much-advanced irreversible changes in bone and joint have no nodules; others have literally hundreds of nodules scattered all over the body, with new ones appearing in crops. Of these two types it is the nodular patient who appears to fare worst.

### Polyarteritis

The sufferer from severe rheumatoid arthritis has often several rheumatoid nodules visible over bony prominences and a strongly positive sheep-cell-agglutination test. This patient has a less favourable prognosis than his fellow-sufferer without these features, more particularly as he is more likely to show changes of a rheumatoid polyarteritis, with visible vascular symptoms referable to different viscera. Over the past 15 years, since corticosteroid therapy came into its own, I have seen an increasing number of patients with rheumatoid arthritis complicated by necrotizing arteritis, and my impression is that, now that high-dosage corticosteroid therapy is much less popular, this polyarteritic rheumatoid picture is also much less common. Nevertheless, widespread polyarteritis may occur as part of the rheumatoid picture in patients who have never received corticosteroids. It is my own personal theory that this complicated polyarteritic picture is more common in patients on corticosteroids because of the fluctuating suppressive effect of the drug, sudden diminution and stopping of dosage being so often followed by an exacerbation of rheumatoid disease and appearance of polyarteritic features with considerable systemic upset. On a constant dosage of corticosteroid I have also seen arteritis follow exacerbation of disease as a result of trauma or infection when steroid dosage was not increased to meet the crisis, and I have been tempted to suggest that periods of inadequate dosage may lead to exacerbations of a mild diffuse arteritis which without steroid therapy would probably never have shown itself.

Kemper, Baggenstoss, and Slocumb (1957) reported that of 52 rheumatoid patients studied at necropsy 38 had received no corticosteroids: none of these developed generalized lesions of polyarteritis, whereas 4 out of 14 treated with corticosteroids did so. These workers believed that vascular changes in rheumatoid arthritis fell into three groups: (1) perivascular or adventitial accumulation of leucocytes, plasma, or other cells, with no necrosis; (2) subacute arteritis with histiocytic and lymphocytic infiltration through all layers of the vessel wall, with no necrosis, but possibly with swelling of collagen and some exudation of fibrin; and (3) lesions of acute arteritis with cellular infiltration and necrosis of vessel wall—that is, a necrotizing angiitis. They thought that in certain patients group 3 changes could be precipitated by corticosteroid therapy, and from my own experience I think they are probably right. Schmid, Cooper, Ziff, and McEwen (1961) have reported similar findings and conclusions.



The arteritis or rheumatoid disease may cause ugly and eventually fatal changes: gangrene of toes and feet; mesenteric infarction; rupture of small aneurysms in kidney, spleen, or gut; and perforation of small intestine. Though arterial changes can be demonstrated in the fingers not infrequently by angiography (Laws, Lillie, and Scott, 1963; Laws, 1965), Bywaters and Scott (1965) make the point that they have never observed histological necrotizing arteritis in the finger vessels, though it may occur in non-rheumatoid (idiopathic) polyarteritis nodosa. Brachial arteriograms in the two conditions are also said to be different (Laws *et al.*, 1963). It is important when dealing with rheumatoid patients to realize that odd pains in abdomen, chest, and elsewhere can be due to serious arteritic manifestations of the rheumatoid disease process.

### Rheumatoid Neuropathy

Like polyarteritis, in rheumatoid disease neuropathic changes, though rare, appear to be more common in patients with nodules and a strongly positive sheep-cell-agglutination test. Both neuropathy and polyarteritis are relatively more common in the male. It may well be that the neuropathy is usually due to, and is part of, the polyarteritic process, but Golding and I (Hart and Golding, 1960) have made a case for this not being the entire answer. In a patient with extensive neuropathic change we could find at necropsy little evidence of involvement of vasa nervorum, and the usual symmetrical involvement of feet more than hands, sensory more than motor, is different from the essentially asymmetrical motor neuropathy in primary polyarteritis nodosa. In the neuropathy of diabetes mellitus involvement of vasa nervorum was first held to be the main cause, but in the light of further study this has been abandoned as only one relevant factor. In our opinion, although arteritis may be the cause in many cases, it does not adequately explain all. Our more severe cases had been on corticosteroid therapy, though 12 out of 42 cases reported had never received this treatment. We see far fewer cases now that large-dose corticosteroid therapy has been abandoned—by large I mean more than 8 mg of prednisolone daily or its equivalent. Ferguson and Slocumb (1961) also found the disorder more common in patients showing signs of hypercortisonism. Rare as rheumatoid neuropathy may be, Pallis and Scott (1965) have reported 30 cases, and Bennett and Scott (1965) have drawn attention to the fact that autonomic nerves may be involved. It is re-

sistant to all forms of therapy. If severe and extensive it carries a bad prognosis.

### Compression Neuropathies

It is not unusual for rheumatoid arthritis to present as a carpal-tunnel median-nerve compression syndrome, the patient complaining of nocturnal burning and tingling in the arms. There are usually other features of rheumatoid arthritis present to suggest the diagnosis, but these are often overlooked at the time, and operation is performed, often successfully, to relieve the pressure. Similar compression of the ulnar nerve at the elbow by the rheumatoid inflammatory mass may occur, necessitating freeing of the nerve and transplanting it anteriorly.

We have reported (Hart and Golding, 1960) a case where ulnar-nerve compression was caused by a thickened arcuate ligament between the two heads of flexor carpi ulnaris, the near-by rheumatoid changes in the elbow causing no direct pressure: the condition was immediately relieved by simple division of the ligament. This had been well described by Osborne (1957) in his original account of the condition, and he has since (Osborne, 1959) given an excellent account of the various ways in which this nerve may be affected. The most dangerous of neurological complications in rheumatoid arthritis, however, is spontaneous atlanto-axial dislocation, with the risk of compression of the cord on the odontoid process and symptoms varying from pain in the upper part of the neck to complete quadriplegia. Sharp and Purser (1961) concluded as a result of their studies that over the age of 45 years a separation of more than 3 mm of the odontoid process from the anterior arch of the atlas on a conventional lateral film is usually abnormal, and that x-ray films taken of the neck in extension and flexion may give the diagnosis. Treatment with supports may be necessary, and sometimes occipito-cervical fusion, the indication for operation being the presence of neurological signs. In some cases, as in a boy under our care, the odontoid process becomes eroded completely away. When this happens cord compression is less likely to occur.

### Rheumatoid Lung

A rich literature has sprung up under this heading, and those of us who are seeing large numbers of rheumatoid sufferers every week wonder how many we are missing; for it seems to be the rarest of rheumatoid involvements. Where we have found fibrosis or pleural effusions there has usually been

another more likely explanation, as in a case Mackenzie and I reported some years ago (Hart and Mackenzie, 1955). Aronoff, Bywaters, and Fearnley (1955) also commented on the relative rarity of such lesions. Nevertheless, lung and pleural lesions do occur in the following forms: (1) pleural lesions, (2) diffuse interstitial pulmonary fibrosis, (3) rheumatoid pneumoconiosis (Caplan's syndrome), (4) lung nodules, and (5) combinations of 1-4.

1. We have seen pleural nodules on two occasions masquerading as apical bronchial carcinomata, the solid lesion removed at operation proving to be a large rheumatoid nodule, in one case causing pain by pressing on and eroding adjacent ribs, x-ray films strongly suggesting an invasive lesion. Both were advanced cases of nodular rheumatoid disease. In neither was there evidence of neoplasia or any other pathological condition. Pleural effusions have been reported as part of the rheumatoid disease process (Emerson, 1956; Horler and Thompson, 1959).

2. Occasionally, usually in males, a diffuse fibrosis develops in rheumatoid cases with a positive sheep-cell-agglutination test, where there seems to be no other cause; but we find it rare, unlike Malcolm Thompson in Newcastle (Thompson and Leathart, 1965), who sees it more frequently, again usually in males. According to the *British Medical Journal* (1965) the process, thought to be autoimmune in nature, starts as an inflammation in the alveolar walls with infiltration of lymphocytes and plasma cells. Turner-Warwick and Doniach (1965), in a study of 48 patients with interstitial pulmonary fibrosis, found that 14 had rheumatoid arthritis, all with rheumatoid factor in their serum. No specific lung autoantibodies were found.

3. The large rounded nodules reported by Caplan in coalminers have since been described in workers with asbestos, iron, and silica. Miall (1955) found no higher incidence of rheumatoid arthritis in coalminers than in others. It is possible that any irritant dust has a different action in the rheumatoid sufferer's tissues from that in others.

4. Nodules in the substance of the lung are rare.

#### Crico-arytenoid Involvement

Involvement of the crico-arytenoid joint is one of the more unpleasant events in the life of the rheumatoid (Copeman, 1957; Baker and Bywaters, 1957). Happily it is rare in its advanced and obvious form. The cords cannot be fully abducted because of involvement of the crico-arytenoid joint, and the patient experiences dyspnoea or stridor on

exertion, hoarseness, and inability to raise the voice. Pain radiating to the ears may occur, and fullness in the throat when swallowing or speaking. During bouts of infection of the upper respiratory tract these symptoms become rapidly worse, and a tracheostomy may be urgently necessary. It is probably much more common than we think, because only the advanced cases with severe symptoms are diagnosed. On laryngoscopy there may be oedema and redness and reduced mobility of joint and cord. Bienenstock, Ehrlich, and Freyberg (1963) found crico-arytenoid involvement in seven out of eight necropsies on rheumatoid sufferers and made two good points: (1) that it should be thought of more frequently—17 out of 64 randomly selected rheumatoids had symptoms considered to be due to this complication in their series; and (2) that sedatives should never be used in such cases, as they may dangerously depress respiration.

#### Scleromalacia Perforans

In our experience chronic uveitis is no more common in rheumatoid arthritis than in the population at large, unlike Reiter's disease and ankylosing spondylitis, where it is much more frequent. Scleromalacia is rheumatoid nodulation occurring in the sclera—a rheumatoid nodular scleritis. This may leave the sclera atrophic and blue-looking or may perforate the eye, with complete and permanent loss of vision. Happily it is a rare complication.

#### Cardiac Lesions

The lone aortic reflex seen occasionally in ankylosing spondylitis and Reiter's disease may also occur in rheumatoid arthritis, though very rarely (Zvaifler and Weintraub, 1963): three of the five patients (two men and three women) reported had nodular episcleritis or scleromalacia perforans also (Weintraub and Zvaifler, 1962). At necropsy two of these patients had rheumatoid granulomata similar to rheumatoid nodules in the myocardium, with evidence of aortitis and dilatation of the aortic root. The condition tends to be milder clinically with rheumatoid arthritis than with ankylosing spondylitis.

#### Swelling of the Calf

A not uncommon complication of rheumatoid arthritis is sudden development of swelling of the leg below the knee. This usually occurs when there is considerable arthritic involvement of the joint with effusion. The swelling may prove to be due to:

(a) Venous thrombosis, predisposed to by slowing of venous return at the affected joint, or



(b) rupture of the knee-joint, the joint fluid setting up an inflammatory reaction as it escapes into the tissues of the calf. Pressures within the knee rise considerably when the joint is tightly flexed, particularly when the patient does a "full knees bend," Dixon and Grant (1964) raising intra-articular pressures in normal knees from 30 to 1,000 mm Hg by this manoeuvre. Rupture of the synovial cavity may closely resemble venous thrombosis of the calf, and both may give a positive Homan sign; there is little doubt that in the past some cases of the former have been misdiagnosed as the latter. Arthrographic studies by Tait, Bach, and Dixon (1965) have shown that the rupture occurs at the back of the knee between the insertions of the semimembranosus and semitendinosus muscles medially, and the medial head of the quadriceps laterally, most of the fluid tracking down beneath the deep fascia and dispersing among the muscles of the calf, only a small amount of fluid passing superficially. A large swelling in the knee or semimembranosus bursa which suddenly lessens or disappears at the time of the appearance of an inflamed swollen calf should suggest the diagnosis. Correct diagnosis is essential, as the treatment of the two conditions is entirely different, the ruptured knee needing rest and possibly splintage, but not anticoagulants.

Less dramatic swelling may occur in the calf or below other affected joints, such as shoulder or elbow. It would seem that the synovium of a joint or bursa may either proliferate downwards, to appear as a cystic swelling below the joint, or it may rupture silently with little and mild inflammatory reaction, to appear as a cystic swelling, in the calf, arm, or forearm. A synovial sac involved by the rheumatoid disease process may proliferate wildly and appear in places well beyond its usual anatomical site, and the fluid within it, if rupture occurs, seems, unlike normal joint fluid, to be productive of acute pain and inflammatory changes.

### Amyloidosis

Amyloid, as Kenney and Calkins (1965) succinctly remark, remains uncertain in its composition, unknown in its pathogenesis, and resistant to treatment. The previous differentiation into "primary" and "secondary" falls down frequently on clinical grounds, primary disease not always being a localized or discrete entity and the two often overlapping in sites of distribution, and chemical tests fail in general to show essential differences. The incidence in rheumatoid arthritis varies with the enthusiasm in looking for it, and ranges from 5 to

60%; Fearnley and Lackner (1955), using a modified congo-red test, found 8 cases among 183 patients studied in one year.

Extensive replacement of renal parenchyma by amyloid may persist with only slight proteinuria for several years before nephrosis or renal failure occurs. Renal-vein thrombosis may occur as a complication, revealing itself either as acute renal failure or as slow development of the nephrotic syndrome (Barclay, Cameron, and Loughridge, 1960).

Amyloidosis in rheumatoid disease occurs usually in the more advanced case which has been active for many years, and it is usually fatal within five years of diagnosis. Kidney biopsy gave the highest yield of positive results, 87%, in the 10-year study of Blum and Sohar (1962), rectal mucosa coming second with 75%; gingival biopsy was positive in only 20% of cases. In our unit we use rectal biopsy as being the best-tolerated investigation of a condition which has no effective therapy, and this we do only if persistent proteinuria or rising blood urea makes this diagnosis seem likely.

### Secondary Infection

Rheumatoid arthritics are often ill, debilitated persons, and their tissues have a diminished resistance to infection. This is seen in its extreme form in Felty's syndrome, where the low white blood cell count predisposes to infection. Such cases often respond dramatically to splenectomy, as in two of our cases reported by Gibberd, Gilbertson, and Jepson (1965). Kellgren, Ball, Fairbrother, and Barnes (1958) have drawn attention to the frequency with which pyarthrosis occurs in chronically inflamed rheumatoid joints, and this we have often seen. It is a safe rule to regard all solitary joint exacerbations in rheumatoid disease as possibly due to infection or local injury rather than primary exacerbation of the disease process. Aspiration will reveal pus in the former, possibly a haemarthrosis in the latter. Although infections of joint, perinephric regions, and subcutaneous tissues appear to be more common in corticosteroid-treated patients, these complications occur not uncommonly in rheumatoids not so treated, and pyaemia and septicaemia should be suspected, and blood cultures taken, if persistent fever appears for no reason in a debilitated rheumatoid sufferer. Septic complications are not always accompanied by a Leucocytosis, and blood counts are not always helpful.

### Bone Fractures

Though it is not unusual to see fractures of vertebrae and ribs in patients rendered Cushingoid by

prolonged corticosteroid therapy, fractures of these and of long bones may occur where such therapy has never been given. I was called to one patient's home because the arthritis in his elbow, as he thought, had flared up: in fact, when stretching to undo his back braces button he had snapped radius and ulna 2 in. (5 cm) below the elbow. Another man deceived me into thinking he had acute gout, as the leg just above the ankle was swollen, red and shiny, and intensely painful, preventing him from walking. It had come on rapidly, like gout, in the small hours, but was due to a fracture of tibia and fibula occurring as he stepped from his bed on to the floor to visit the lavatory. Such minor traumata are all that is necessary in advanced cases with bones porotic from prolonged disease and restricted mobility. I had a most unusual case under my care last October in St. Stephen's Hospital. A woman of 50 with rheumatoid arthritis of only moderate degree and activity, without any major injury, split her pelvis through ilium and ramus. She attended hospital only because walking caused pain in the affected side of the pelvis. Such lesions occur extremely rarely in normal people, and I know of no other similar case.

#### Relation of Rheumatoid Arthritis to Systemic Lupus Erythematosus

I have been dealing so far with systemic features of an essentially arthropathic disorder. Where does rheumatoid arthritis stop and systemic lupus start? It is tempting to regard both as variations on one autoimmune theme, S.L.E. being considered, as it were, a malignant or systemic variety of rheumatoid arthritis. The danger of this theory lies in its therapeutic implications. It has taken us many years to realize that high dosage in long-term suppressive therapy in rheumatoid arthritis starts at 6-8 mg daily, and that complications inevitably will follow at higher dose levels. If rheumatoid arthritis blends into S.L.E., then low-dose therapy should logically run on into higher dosage according to severity of symptoms and the efficiency of their suppression by corticosteroids. This, in my opinion, is a dangerous

conception and a false one. Treatment of a potentially fatal condition such as S.L.E. should be considered quite apart from rheumatoid arthritis, or dangerous complications will occur if both are treated on like lines.

Several workers (Goldfine, Stevens, Masi, and Shulman, 1965, Hazevoet and Kievits, 1966) have made the point that patients with rheumatoid disease with L.E. cells present in their circulating blood fare no differently from cases without such cells, so far as prognosis, complications, and treatment are concerned. Though cases do occur which seem to lie between the two conditions, unless the very definite diagnosis of S.L.E. is made treatment should be kept at safer conservative levels. To treat rheumatoid arthritis as systemic lupus is to court disaster.

#### Drug Complications

The commonest of complications in rheumatoid arthritis are the drug-induced ones: dyspepsia from aspirin or phenylbutazone, Cushing's syndrome from cortisone or its analogues, headaches from indomethacin, and so on. But this is a subject on its own, which will not be discussed. Suffice it to say that in the long years of corticosteroid overdosage as many patients suffered from drugs as from disease, and even today overtones and complications of therapy colour the clinical picture of most severe cases of rheumatoid arthritis one sees.

#### Summary

In rheumatoid arthritis we have a disorder which continues for many years; which affects body and soul, and does not stop at the bones and joints. These patients are systemically ill as well as arthritic. Nevertheless, to merge rheumatoid disease on autoimmune grounds into the picture of other connective-tissue disorders, such as systemic lupus erythematosus, is to turn the calendar back to the days of corticosteroid overdosage. I only hope Dr. Wilfred Edgcombe would have approved the message. I think he would.

(The references may be seen in the original article.)

## MEDICAL ABSTRACTS

### FATIGUE FRACTURE OF THE FEMORAL NECK

MAJ L. D. Blickenstaff MC USA and J. M. Morris MD, U.S. Army Hospital, Fort Ord Infantry Training Center, Fort Ord, Calif, and the Department of Orthopedic Surgery, University of California School of Medicine, San Francisco. *J Bone Joint Surg* 48-A: 1031-1047, September 1966.

Fatigue, or stress, fracture of a metatarsal is a familiar condition generally readily recognized, but when this type of fracture occurs in other regions, such as the fibula, the calcaneus, the tibial shaft, the tibial plateau, the distal part of the femur, the femoral neck, or the ischiopubic ramus, it may present a difficult diagnosis say the authors. They consider fatigue, or stress, fractures to be an alteration of apparently normal bone caused by repeated sub-maximum stresses. Forty-one fatigue fractures of the femoral neck in 36 patients are presented and analyzed. All occurred in men undergoing the first eight weeks of basic infantry training (average age twenty-two and one-half years) and in none was there any evidence of pathological conditions affecting the bone.

Three types of fractures are described, Type I: fractures with endosteal callus, periosteal callus, or both, without a fracture line; Type II: fracture line present in the calcar region or across the neck, without displacement; Type III: displaced fractures.

No definite relationship could be established between occurrence of fractures and length of training. Pain and stiffness in the hip region were almost always present and had lasted from one day to four weeks prior to entry into the hospital. Patients with displacement had sudden, severe pain and collapse and, generally, inability to bear weight. Most had a limp or antalgic gait, limitation of hip motion due to pain, and tenderness over the hip joint.

Treatment of Type I was conservative—bed rest followed by progressive weight bearing; for Type II—generally conservative but did include plaster immobilization and in one case, internal fixation; for Type III—internal fixation.

Complications were frequent in Type III and consisted of malunion, non-union and avascular necrosis.

The need for serial roentgenograms to establish diagnoses is emphasized.

### CENTRAL VENOUS PRESSURE AND DIRECT SERIAL MEASUREMENTS AS GUIDES IN BLOOD-VOLUME REPLACEMENT

E. Friedman MD, E. Grable MD, and J. Fine MD, Department of Surgery, Harvard Medical School and Beth Israel Hospital, Boston, Mass. *Lancet* II(7464), September 17, 1966.

The establishment of suitable guides for determining the amount of blood necessary to obtain optimal blood volume after blood loss is the motivation for this article. The authors discuss central venous pressure (c.v.p.) as an indicator and come up with opinion that it is not completely reliable for what appear to be some very valid reasons. Among them: large deficits have been demonstrated during elective surgery and after major accidental trauma that are not revealed by monitoring the c.v.p.; in traumatic or septic shock, the c.v.p. often fails to reflect the presence of a significant deficit; when it is at a low level, it may return to normal in response to transfusion before the deficit has been sufficiently made up; the current practice of administering blood until the c.v.p. reaches the upper limits of normal can result in overload, which is not only of no therapeutic value but is likely to be harmful. They propose, and support their proposition with a report of a comparative study in the same patients, direct measurement of the blood-volume with the aid of modern computer devices together with determinations of the c.v.p.

### REOPERATION FOR BRONCHOGENIC CARCINOMA

W. B. Neptune MD, F. M. Woods MD, and R. H. Overholt MD, *J Thorac Cardiovasc Surg* 52: 342-350, September 1966.

Fifteen patients who had a second pulmonary resection for bronchogenic carcinoma are reported in this article. All originally had had a favorable operation and good pulmonary reserve; the new or recurrent tumor was discovered early; and the



second operation was done for what appeared to be localized disease. This group was from a total of 2,400 verified cases of bronchogenic carcinoma with 1,176 primary resections. Initially, four were found by survey roentgen examination and were free of symptoms; one had a resection for bronchiectasis and carcinoma-in-situ was found in the surgical specimen; two had had bilateral primary tumors initially and were treated by staged procedures. The second operation was done in eight for a new lesion discovered at follow-up examination; none of these had symptoms. There was one postoperative death; five died prior to this report, and nine patients were alive and well without evidence of tumor at the time of the report. The authors believe that management is no different whether new-found disease is primary or recurrent and that if a new lesion appears to be localized and is amenable to surgical excision, this is the procedure of choice.

(See U.S. Navy Medical News Letter, Volume 48, No. 9: A Review of 26 Years' Experience with Pulmonary Resection for Metastatic Cancer—Editor.)

#### CONSIDERATIONS IN THE MANAGEMENT OF ACUTE TRAUMATIC HEMOTHORAX

A. C. Beall, Jr. MD, H. W. Crawford MD, and M. E. DeBakey MD, *J Thorac Cardiovasc Surg* 52: 351-360, September 1966.

The authors have reviewed 694 consecutive cases of acute traumatic hemothorax over a ten year period treated in the city-county charity hospitals of Houston and Harris County, Texas. Heart wounds were treated primarily by pericardiocentesis, cardiorrhaphy being reserved for patients who did not respond to pericardial aspiration or who developed tamponade again after aspiration. They state that although thoracentesis may be used for minor degrees of hemothorax, rapid institution of intercostal tube thoracotomy, using tubes of adequate size, appears to be the most effective means of evacuating blood from the pleural space. In addition, such constant drainage usually provides the most accurate means of evaluating continued hemorrhage. Thoracotomy was required for control of bleeding in some who had injury of a systemic vessel or a pulmonary hilar structure. They stress that prolonged delay before operation in patients with significant continued bleeding should not be allowed to occur and that while attempts should be made to replace circulating blood volume prior to thoracot-

omy, operation in such patients does not follow resuscitation but is an integral part of resuscitation. They feel that continuous pleural drainage provides the best means for preventing empyema. Early delayed thoracotomy for clotted hemothorax is advised. In this series of cases, overall mortality was 7.9 percent including patients in whom the only form of therapy was thoracotomy for cardiac massage. Empyema occurred in only nine instances and was usually associated with contamination of the pleural space by gastrointestinal contents at the time of injury. Formal decortication was required only twice. The average period of hospitalization for the 639 survivors was 10.7 days and almost all prolonged hospitalization was related to associated injuries rather than to the thoracic injury itself.

(See U.S. Navy Medical News Letter issues 27 May 1966, p 2 and 12 August 1966, pp 3-11—Editor.)

#### COMPARATIVE BLOOD LEVELS OF HETACILLIN, AMPICILLIN AND PENICILLIN

S. B. Tuano MD, L. D. Johnson MD, J. L. Bordie, and W. M. Kirby MD, *New Engl J Med* 275: 635-639, September 22, 1966.

This investigation was done in the Department of Medicine, Division of Infectious Diseases, University of Washington School of Medicine. Hetacillin, the authors note, is a unique derivative of 6-aminopenicillanic acid in which the 6-amino group is part of the imidazolidinone ring and has a spectrum of action similar to that of ampicillin. It was included in this study as a new investigational drug with similar therapeutic potentialities. Healthy volunteers were used. Antibiotic concentrations in the serum, after intravenous infusions of 0.5 gram per hour with and without probenecid (the latter only with penicillin G and ampicillin), were determined at 1, 1½, 2½, and 3 hour intervals; renal clearances of the three drugs, and six hour urinary excretion of ampicillin with and without probenecid were determined. In their summary, the authors state that during the third hour, after the blood levels had become relatively constant, ampicillin levels were 81 percent higher on the average than levels of penicillin G; the renal clearance of penicillin G was almost twice that of ampicillin and 75 percent of both drugs was excreted in the urine, indicating that the renal mechanism was mainly responsible for the

difference in blood levels; hetacillin gave even higher serum concentrations and over 90 percent was excreted in the urine; the results indicate that six grams of hetacillin per day or eight grams of ampicillin should be equivalent to twelve grams of penicillin G (19,200,000 units) in the therapy of serious bacterial infections.

#### LOBULAR CARCINOMA OF THE FEMALE BREAST—REPORT OF 73 CASES

*W. Newman MD, From the Department of Pathology, The George Washington University School of Medicine and the George Washington University Hospital, Washington, D.C. Ann Surg 164: 305-314, August 1966.*

Dr. Newman, in this report, presents 73 cases of "pure" infiltrating lobular carcinoma of the breast—which he selected from a total of 1,396 cases of carcinoma of the breast. The diagnosis was established by rigid and stringent criteria. In 72 of these, histologic evidence of "early" antecedent, in situ lobular carcinoma was found and this, he feels, indicates a continuum of in situ lobular carcinoma to infiltrating lobular breast cancer. The treatment he recommends for in situ carcinoma, once the diagnosis has been confirmed by permanent sections, is modified simple mastectomy plus a random biopsy of the upper outer quadrant of the opposite breast at the time of the mastectomy; removal of all breast tissue plus low-lying adjacent, level I nodes, leaving the pectoral muscles intact; similar treatment for the second breast if the biopsy is positive. If the biopsy of the second breast is negative, this breast should be examined periodically by means of mammography and thermography. He states that the use of the modified simple mastectomy obviates the need for additional surgery if a small focus of invasion is found in the mastectomy specimen since the closest drainage area would already have been removed.

If invasive carcinoma is proved by frozen section at biopsy, a classical Halsted-Meyer radical mastectomy is done by the author and if infiltrating lobular carcinoma is found on permanent sections of the tumor with extensive areas of in situ lobular carcinoma, he recommends mammogram of the remaining breast and biopsy of any suspicious areas. If the mammogram is negative, random biopsy of the outer upper quadrant and the same procedures followed as outlined for the in situ lesion are recommended.

The author emphasizes that once invasion of the

stroma has taken place, the sequence of events is essentially similar to that of the more frequent types of duct carcinoma.

#### IMMERSION FOOT

*Public Affairs Office, Bureau of Medicine and Surgery, Department of the Navy.*

A team of Navy physicians has been working with Marine Corps volunteers at the Navy Medical Field Research Laboratory, Camp Lejeune, North Carolina. As a result of their efforts they are now able to offer the Marines considerable protection against the effects of tropical immersion foot by the daily use of 100% silicone ointment. Immersion foot is caused by prolonged exposure to water. The condition is prevalent in the troops operating in the terrain peculiar to Vietnam.

It was shown that 100% silicone ointment will prevent tropical immersion foot symptomatology for as long as five days and possibly longer. The great majority of the treated subjects developed only minimal objective evidence of immersion foot.

The studies indicate the potential value of 100% silicone ointment in preventing tropical immersion foot in Vietnam and it is planned to conduct field trials under combat conditions during the coming monsoon. If it can be shown that this silicone material is as effective as the Camp Lejeune studies indicate, and that it is practical to use under combat conditions, it would be recommended that this protective be purchased for use by troops whenever constant wet operations are contemplated.

#### EARLY PERFORATION IN APPENDICITIS AFTER AGE 60

*A. G. Coran MD and H. B. Wheeler MD, Surgical Service, Peter Bent Brigham Hospital and Veterans Administration Hospital, West Roxbury, Mass., and the Department of Surgery, Harvard Medical School, Boston. JAMA 197: 745-748, Sept 5, 1966.*

Twenty-eight consecutive cases of acute appendicitis are reviewed in patients 60-91 years old. The appendix had perforated in 17 of 21 who were operated upon more than 24 hours after the onset of symptoms, but in only one of six operated upon before this time lapse. Perforation was frequently correlated with septic complications and the authors feel that this was the chief cause of mortality (7 percent) and of the complication rate (41 percent). The

clinical picture was similar usually but less striking than that seen in young adults. At operation the appendix was gangrenous in 19 of all the patients. Reasons why older individuals are more prone to early perforation than younger individuals are discussed (decreased lymphoid tissue and decreased blood supply in the appendix plus sociologic features which might militate against prompt medical treatment).

The findings in this study are compared with those of a similar one carried out at the Peter Bent Brigham Hospital 30 years previously. The most striking difference is a reduction in mortality, 28 percent to 7 percent. Perforation had occurred in 82% of the older series, and only one-third of the patients were felt to have displayed a "typical" clinical picture.

While the clinical management of elderly patients with acute appendicitis is little different than that of younger adults, the authors emphasize that the suspicion of appendicitis in the former is a stronger indication for early laparotomy because of the possibility of early perforation.

#### AN ANALYSIS OF FACTORS PREDISPOSING TO GRAM-NEGATIVE BACILLARY NECROTIZING PNEUMONIA

A. K. Pierce, E. B. Edmonson, G. McGee, J. Ketchersid, R. G. Loudon, and J. P. Sanford, *Departments of Internal Medicine and Pathology, University of Texas Southwestern Medical School, Dallas, Texas. Amer Rev Resp Dis 94: 309-315, Sept 1966.*

This study was undertaken to examine factors that possibly contribute to the increasing incidence of gram-negative bacillary pulmonary infections. Gram-negative bacteria, including *Pseudomonas* species cause a specific necrotizing pneumonia which is recognizable histologically, and this fact facilitates a retrospective approach and obviates depending on either routine postmortem cultures which are notably unreliable or antemortem sputum cultures in which the relationship to the pneumonic process is not always clear. In 1963, this necrotizing pneumonia process was present in 41 of 522 autopsied patients (7.9 percent). On comparing the hospital course of this group with a similar group of autopsied control patients it was found that reservoir nebulization, penicillin, "anti-gram positive" agents, and broad spectrum antimicrobials had been used significantly more frequently in the pneumonia patients. Steroids had been utilized more frequently also but the level of significance was borderline. Shock and anemia were significantly more frequent than in the control

group. From this the authors feel that it is reasonable to postulate that a seriously ill patient may develop gram-negative bacillary pneumonia because of the alteration of host flora by antimicrobial therapy followed by the inoculation of large numbers of gram-negative bacilli by contaminated aerosol and that shock or anemia may further increase the likelihood of developing necrosis.

(See Pneumonias Caused by Gram-Negative Bacilli, U.S. Navy Medical News Letter 47(10):4-13, May 1966.—Editor)

#### CORRELATION BETWEEN ALLERGY TO SUTURE MATERIAL AND POSTOPERATIVE WOUND INFECTIONS

CDR L. C. Getzen MC USN and LT G. A. Jansen MC USN, *Surgical Research Laboratory, U.S. Naval Hospital, San Diego, Calif., Surgery 60: 824-826, October, 1966.*

Two hundred five randomly selected male patients who had undergone "clean", elective, major abdominal surgical procedures were studied. The day following surgery, each subject was skin tested with the specific suture material which had been used to close his wound. Silk, nylon, and plain and chromic gut were employed. The skin of the interscapular region was used as the test area. This was prepared by using procedures identical to those used in preparing the skin for surgery and within this area, a single loop of each suture material was sewn into the dermis and then tied in place. The test sutures were placed at least six cm apart. Observations of the implants were made at 24, 48, and 72 hours for evidence of any allergic skin reaction. A positive reaction was recorded when an area of induration at least one cm in diameter developed around the suture material. Eosinophil counts were done on all patients preoperatively and on the third postoperative day.

Twenty-nine of the patients (14 percent) developed postoperative wound infections. Organisms isolated from the wounds were *Staphylococcus aureus*, *Streptococcus fecalis*, *Escherichia coli*, and *Streptococcus pyogenes*. Twenty-four of these 29 (83 percent) had a positive skin test for either silk or the chromic suture materials. Only nine (five percent) of the 176 without infected wounds had a positive skin test. Thirty-two of the 33 patients with positive skin tests and only four of the 172 patients with a negative skin test had a significant rise in postoperative eosinophil count (26 to 28 percent). The five with infected wounds but negative skin tests had no rise in eosinophils. Five of the 24 infected positive re-



actors (21 percent) and none of the infected negative reactors gave a history of allergic disease. Positive skin reactions were well distributed among all types of suture materials used except nylon, which caused no reaction.

The authors think, from this study, that an allergy to suture material may play a contributing role in the development of wound infections and that in subsequent surgical procedures, patients who have demonstrated previous wound infections should be sutured with synthetic, nonallergic material such as nylon, dacron, or wire and that the same should be used in individuals with histories of allergy.

#### AUTOGENOUS VEIN BYPASS— AN IMPROVED TECHNIQUE

*J. P. Royle FRCS, St. Bartholomew's Hospital,  
London, England, Surgery 60: 795-796, October  
1966.*

The author describes a technical maneuver to increase the diameter at the proximal end of a reversed saphenous vein graft when the latter is used to bypass an arterial obstruction. He does this by using a short length of a tributary near the distal end of the intended graft. The tributary is tied off seven to eight mm away from wall of the vein (instead of flush with the wall). The graft at this end is then cut in a longitudinal line which will carry the incision into the middle of the tributary, enlarging the opening by the length of the incision of the wall of the vein plus the length of the incision into the tributary. Production of a rectangular defect in the artery, he feels, facilitates the anastomosis. If the length of vein needed for the bypass is in doubt when the graft is being prepared, two or three tributaries can be preserved as described and those not used tied off flush subsequently.

*Editor's Note*—A technique for valve excision in autogenous vein grafts is described by George Jackson, Jr., MD in Surgery, Gynecology, and Obstetrics 123:845-846, October 1966. This allows replacement of the vein in its natural direction.

#### PING-PONG DRUG RESISTANCE NEW PUBLIC HEALTH HAZARD

Bacteria usually acquire resistance to a specific drug by spontaneous mutation and selection. Resistance to unrelated drugs usually develops by independent mutational events so that successive selections are required for the emergence of strains resistant to more than one agent. Observations made in Japan (1959) suggested that drug resistance can arise in another manner, i.e., by the transfer of resistance genes within and between bacterial species. The transfer is by conjugation and involves temporary specific attachment of two bacterial cells with transfer of deoxyribonucleic acid (DNA) from donor to recipient cells. The resistance genes meet the criteria of an episome. Recipient bacteria acquire the capacity to become donors and are thus capable of transferring resistance to other sensitive bacteria. *Gram-positive bacteria do not conjugate so that only gram-negative bacteria transfer resistance factors.* The present investigation was undertaken to determine if resistance factors are involved in drug resistance of enteric bacteria in the U.S. Bacteria isolated from 32 patients with salmonella infections were examined. Twenty-four strains were found sensitive to each of nine drugs tested. One strain was resistant to streptomycin only and seven were resistant to streptomycin and one or more of the other drugs. All seven strains with resistance to more than one drug were found to carry resistance factors. Six of the seven strains transferred the resistance factor to sensitive organisms by conjugation in mixed culture. Six patients who excreted multiple-resistant salmonella had never been treated with antibacterial drugs prior to culture, and six had had no contact with persons outside New England. It is obvious from this study that resistance factors are widespread in the U.S. (as they are in Japan), that they play a major role in the resistance of enteric bacteria, and that they constitute a previously unrecognized public health problem.—Smith (Boston, Mass.), New England J. M. 275:625 (Sept. 22), 1966.—From Clin-Alert No. 263, October 14, 1966, republished by permission of Science Editors, Inc.

## AWARDS AND HONORS SECTION

### SILVER STAR MEDAL

Bardwell, Robert Jean, 689 71 72, HM3, USN  
Barraud, Wesley LaClaire, 546, 65 09, HM2, USN  
Campion, Charles George, 373 97 10, HM3, USN  
Counce, Donald Eli, 686 15 29, HN, USN  
Dona, Bienvenido C., 596 44 86, HM3, USN  
Fitzpatrick, Richard Joseph, 799 01 83, HM1, USN  
Fredette, Bradford Theodore, 682 61 36, HN, USN  
French, James Layton, 681 76 03, HM3, USN  
Garnett, Arthur Howard, 698 00 59, HM3, USN  
Gibson, James Richard, Jr., 692 55 68, HN, USN  
Goldstein, Paul Allen, 688 18 77, HN, USN  
Ingram, Robert Roland, 771 92 05, HM3, USN  
Johnson, William Donald, 903 41 83, HM3, USN  
Kidder, Ronald Wayne, 686 64 15, HM3, USN  
Leitner, Terry Lee, 771 67 28, HN, USN  
Matticks, Robert William, 686 66 94, HM3, USN  
Ross, James Cornelius, 596 44 86, HN, USN  
Steward, Larry Jon, 597 05 91, HM3, USN

### NAVY & MARINE CORPS MEDAL

Kelly, David R., 697 39 20, HN, HM-8404, USN

### BRONZE STAR

Ankers, Harry Malcolm, 696 69 38, HN, USN  
Boehme, Lynwood Wm., 699 62 47, HM3, USN  
Butler, Jackie Wayne, 770 79 13, HN, USN  
Cannon, Lewis Vertice, 687 15 49, HN, USN  
Collins, Jerry Michael, 692 58 95, HM3, USN  
Darnell, Leon (n), 694 66 69, HM3, USN  
Day, Lynn Blair, 775 73 36, HM3, USN  
Douds, James Eugene, 687 62 59, HN, USN  
Fraser, Dale McDonald, 772 46 97, HM3, USN  
Gamache, Paul George, 514 10 78, HM2, USN  
Hall, Jack Douglas, 545 32 28, HN, USN  
Hinojos, Paul Roche, 773 10 95, HN, USN  
Hoffman, Jerry Alan, 684 41 04, HN, USN  
Johnson, Walter C., 543 89 44, HM2, USN  
Jones, Leslie Jerome, 688 03 63, HN, USN  
Kunkel, Gary Dean, 390 65 88, HN, USN  
Larson, James Andrew, 695 69 52, HM3, USN  
Lawson, Charles David, 530 47 11, HM2, USN  
Lazzari, Dennis James, 583 84 71, HM3, USN  
Lovejoy, Melvin Charles, 776 30 42, HM3, USN  
Martin, Douglas Euguine, 681 48 11, HM3, USN  
Matthews, John Lenton, 770 96 77, HM3, USN  
McIntosh, Jerry (n), 913 08 92, HM3, USN  
Mendoza, James William, 440 42 70, HM1, USN  
(also received Navy Commendation Medal)

## DENTAL SECTION

### STUDIES CONCERNING THE POLISHING PROPERTIES OF ZIRCONIUM SILICATE ON ENAMEL

G. K. Stookey, J. R. Hudson, and J. C. Muhler, *J Periodont* 37(3): 200-207, May-June 1966.

An earlier report presented the superior enamel surface cleansing and stain removal ability of zirconium silicate (USN Med News Letter 45(8):15, 30 April 1965). This report describes the enamel surface polishing properties of some different types and particle sizes of zirconium silicate. A specially designed reflectometer was used. Freshly extracted maxillary anterior teeth were wet cut to provide

samples of labial enamel, which were dulled by 0.10 percent hydrochloric acid, neutralized, and mounted for study. A handpiece mounted rubber cup at a constant 5,000 rpm and equalized pressure was used to polish. Dry calcium carbonate was used as a standard polishing agent. Particle size determinations were made by aqueous sedimentation and gravimetric separation. Zirconium silicate (Zircate), 5.0 gm mixed with 1.0 ml distilled water, produced a higher polishing ratio than fourteen other commercial pastes. The authors also discussed the unique crystal configuration of zirconium silicate prepared by hammer milling, which makes it an excellent cleansing agent for enamel surfaces until the larger particles

are fractured into smaller particles, and the surface projections are worn away to produce particles which polish the enamel surface. The smaller particles that remain after the cleaning process, coupled with a specific amount of smaller particles originally added to the mixture, serve as a nearly ideal polishing agent. A unique gravimetric effect on particle size militated against the common dental clinic practice of removing excess water from a "soupy" mixture of zirconium silicate.

This finding was explained on the basis that particles less than ten microns in diameter are primarily responsible for obtaining a high enamel luster. A great majority of the zirconium silicate particles less than ten microns in diameter remain suspended in water for more than seven minutes after mixing. Therefore, the removal of excess water by means of a gauze sponge also removes those particles which are primarily responsible for polishing the enamel surface. In summary, zirconium silicate mixtures which have more than ten percent of the particles above 70 microns in diameter are good cleansing agents due to the abrasiveness of the material, and therefore they leave an enamel surface which is clean but roughened and dull in appearance and which allows plaque and debris to attach quickly. Conversely, those hammer milled preparations which contain no particles over 70 microns diameter are excellent polishing agents but are deficient in their ability to remove debris and stains from the enamel surface. Thus, a specially designed mixture of particle sizes provided both cleansing and polishing properties superior to other abrasives presently available as dental prophylaxis agents.

## THE CURRENT STATUS OF THERAPEUTIC DENTIFRICES

*J. K. Peterson, J Mass Dent Soc 15(1): 20-31, Winter 1966.*

Dentistry is in a dilemma regarding therapeutic dentifrices. Although current research suggests that advances in several dentifrice therapeutic factors are imminent, only stannous fluoride dentifrices for cario-stasis can be prescribed with confidence to date. Several investigators are working with antibiotic and enzyme formulations with the hope of influencing favorably the oral hygiene and resultant periodontal tissue health; but this research to date is inconclusive. Several dentifrice formulations have been designed for relief of dental hypersensitivities. Thermodent, which contains 1.4 percent formalin, showed frequent success in treating generalized areas of mod-

erate sensitivities and exposed occlusal dentin; but severe cervical sensitivities were not relieved. Other investigators reported no significant alteration of cervical hypersensitivities with Thermodent. The results with Sensodyne, which contains ten percent strontium chloride as active agent, were similarly conflicting. Two studies reported a decrease in sensitivity. A third was unable to measure any significant alteration in cervical hypersensitivity to either thermal or mechanical stimuli after use of Sensodyne for 30 or 60 days. The cariostatic dentifrices discussed in this review included ammonia and urea compounds, antibiotics, anti-enzymes, sodium fluoride, amine fluoride, stannous fluoride and phosphate fluoride.

Since the ADA Council on Dental Therapeutics, in April 1951, classified ammonia and urea compound dentifrices in Group C "needing further study," two studies reported positive findings. Currently, these dentifrices have little therapeutic status. The same Council has classified penicillin dentifrices in Group C twice. More recently, the Council expressed concern over the possibility of sensitizing a significant portion of the population to penicillin, and the potential development of penicillin resistant microorganism strains from use of those dentifrices. This led to the termination of serious consideration of penicillin dentifrices. Studies are continuing with antibiotics which have little or no systemic therapeutic significance but may control the cariogenic flora. Two anti-enzymes, sodium dehydroacetate and sodium N-lauroyl sarcosinate, have been given adequate clinical trials as cariostatic dentifrices. One study in 1958 showed 51 percent reduction in DFS increment in young adults after two years' use of a dehydroacetate dentifrice. Several studies have been made with the sodium N-lauroyl sarcosinate dentifrice (Colgate Gardol), with cario-stasis ranging from 17.5 to 47 percent, and one study reported no significant difference in caries increment. The most recent sarcosinate report, in 1963, compared Colgate with Crest; but although similar caries increments were recorded, the lack of an untreated control group made the findings equivocal. A basic problem with all fluoride dentifrices is the fact that conventional abrasives tie up the fluoride ion completely, making it unavailable to the enamel surface upon brushing. Special abrasives, as calcium pyrophosphate (Crest), and insoluble metaphosphate (Cue, Fact, Super Stripe) are used more successfully, but even these abrasives tie up the available fluoride ion over a period of months.

Of 13 clinical trials with sodium fluoride dentifrices, two showed positive results. Radike summarized these investigations as essentially negative. However, Bibby disputed this conclusion and felt



that, if a compatible dentifrice formulation could be developed, consistent positive results would be obtained. Concerning amine fluorides, Mathaler reported caries reduction of 32 and 25 percent with two amine fluoride dentifrices after three years. Stannous fluoride containing dentifrices have been most thoroughly tested and reported. Ten reported studies with Crest showed marked caries reduction in all except the Navy study (wherein initial elimination of all detectable caries lesions is believed to have obscured the stannous fluoride effect [abstractor's comment]). In the nine stannous fluoride studies with significant cariostasis, the degree of cariostasis varied with use, with 21 percent in normal home use to 54 percent with supervised brushing three times a day. Cue in three studies showed reductions of 17 to 37 percent dependent on use. Fact showed 12 and 30 percent reduction after one and two years. Brudevold, Chilton and Wellock reported on a sodium fluoride-acid orthophosphate dentifrice developed by Bristol-Myers. Although the authors did not express caries incidence increment reductions, the author of this review calculated reductions of 24 and 36 percent after one and two years. In summary, stannous fluoride dentifrices cause significant but not outstanding cariostasis when used in unsupervised home brushing. The future is not promising for dentifrices containing neutral sodium fluoride, ammonia compounds or penicillin. The outlook for dentifrices based on anti-enzymes, detergent properties, and desensitizing agents is mixed.

## KNOW YOUR DENTAL CORPS

DENTAL RESEARCH DEPARTMENT,  
NMRI, BETHESDA, MARYLAND

Oral surgical research at NMRI is predicated on two areas of immediate concern to both the health of individual personnel and to the overall Navy mission.

The most immediate concern is the need for development of a readily available and easily storable bone graft material for use in major, extensive traumatic injuries. The necessity for such a development has been emphasized by the increased commitments in Vietnam and the concomitant demands for surgical implant material on the Navy Tissue Bank. Of more long term interest is the need for evolution of more effective osseous implant materials in the restoration of inflammatory and degenerative alveolar defects. Recent work on heterogenous bone implantation has focused on an evaluation of a detergent treated, lyophilized calf bone material in effecting reconstruction of edentulous mandibular and maxillary defects of dogs. In a joint effort with the Tissue Bank, a re-evaluation of freeze-dried homogenous bone is being undertaken in various test systems in an effort to enhance the production and effectiveness of this osseous graft material. Following the demonstration of enhanced osseous repair with the implantation of fresh autogenous bone marrow efforts are being directed toward the development of feasible methods of clinical application of marrow transplants to osseous defects. Effect of altered gaseous environments and hyperbaric states of a closed ecology on the metabolism and repair of osseous oral structure is a problem bearing on the future naval dental commitment. At the present time an attempt is being made to establish a background for future investigation by conducting studies on "normal" post-traumatic bone healing. Tetracycline induced fluorescence is used to determine the chronology of normal rates of remodeling and repair of alveolar bone in laboratory animals under various conditions. Uptake of the stannous ion on tooth surfaces following various methods of application of  $\text{SnF}_2$  is being investigated using  $\text{Sn}^{119\text{M}}$ . This study is correlated with the Navy's program of caries prevention by use of fluoride modalities.

# NURSE CORPS SECTION

## NAVY HOSPITAL IN SAIGON

*The following article was written by CDR Aline E. Morin NC USN about the Hospital in Saigon when it was staffed with Navy Nurses. The Army Medical Corps took over this hospital on 1 April 1966.*

*The Navy hospital in Saigon is a special place to its patients and its personnel. Its former nursing service chief tells why and how.*

Navy nursing in Saigon is endlessly varied. Especially when "dust offs" arrive in rapid succession, emergency and operating rooms are the scene of many heart rending dramas of life and death.

The call comes in over the speaker box in the nursing service office: "Dust off in 10 minutes, three seriously wounded Americans." The same alert goes out to the transportation service, the doctor, the emergency room staff. An ambulance with medical personnel is dispatched to the helicopter pad, about five minutes away from the hospital, to await the arrival of the "chopper" bearing the wounded from the field. The medical team is ready for action as soon as the car enters the hospital driveway.

Then there is the everyday drama of caring for victims of tropical diseases like malaria, scrub typhus, dengue fever, and amebiasis. Here nursing care is vital to the patient's recovery and well-being. The scope of Navy nursing in Saigon knows no boundaries. It is a unique experience which comes to a privileged few. The inconveniences of living and working in a restricted environment, always alert to the need to protect oneself from terrorism, seem inconsequential when compared to the satisfactions derived from being a part of history in the making.

The Navy hospital in Saigon was formerly a French hotel-apartment type building. The patient care areas are one-, two-, or three-bed rooms. Structurally, the five-story building is essentially unchanged save for widened doorways. The old, temperamental, two-passenger elevator has its ups and downs depending on the availability of adequate electrical power. Then there is the maze of wires and plugs which require that equipment be adapted before it can be used.

CDR Morin (St. Francis, Hartford, Conn.; BS, Catholic University of America; MNA, University of Minnesota), Navy chief of nursing service at the Navy Station Hospital in Saigon, South Vietnam, when she wrote this article, is now assigned to the Naval Hospital in Newport, R.I.

Reprinted, with permission, from the American Journal of Nursing, September 1966.

Opened in October 1963, this 100-bed hospital serves Saigon and outlying areas. Until the Army hospital was opened in May 1965, it was the only American military hospital in the Saigon area.

A large outpatient clinic, the pharmacy, the laboratory, and an x-ray department are located in another hotel across the street, which is described as the busiest thoroughfare in the city. (A white uniformed, Vietnamese policeman stops traffic so that one can cross without providing the hospital with another casualty.) Now that our modern operating room suite and dining area for patients and staff are finished, the hospital has facilities comparable to those of a well-equipped one in the United States. The patient turnover is such that the hospital provides service as if it were a 300-bed unit. The average hospitalization time of a patient is one week. Patients requiring treatment which is expected to extend beyond 30 days are usually evacuated by air to the Philippines, Okinawa, Japan, or Hawaii.

Living and working conditions at outposts in the field promote closely knit groups of men whose lives depend on the support they give each other. The two- and three-bed units at the hospital preserve the image of community living. Officers and enlisted men share the same rooms. Except for the acutely disturbed, psychiatric patients are not set apart. This has therapeutic value; the patient soon becomes aware that there are others whose lots are much worse than his. The comradeship of the field unit continues when the men on a jaunt to town stop by to see their ailing team members. Since travel is difficult, visiting hours are open from 9:00 a.m. to 9:00 p.m.

Little things mean much—a refreshing bed bath or a cooling shower, clean linen on the bed each day, fresh pajamas whenever perspiration soaks through, a roving barbershop, the hospital's laundry service for muddy field clothes and unwashed underwear, the fruit juices and ice cream served between tasty meals, the homemade goodies supplied by the "mothers' cookie run" from Okinawa. Then there are the latest

movies every evening, church services of one's choice, and the doctors, nurses, and corpsmen to share problems with.

This hospital has many faces. There is the face of the battle casualty, who is grateful for life itself and for the comfort of a clean body in a clean, safe bed. With such patients there are many moments of drama. There was the group of men who were cared for following the battle of Song Be. Some had been left for dead, later to be hidden in a pig sty by friendly villagers. Brought in on litters some 36 hours later, covered from head to foot with red, clay-like mud, they had gaping, festering wounds, fractures of every description, and serious chest injuries. Medical and nursing care was extensive and intensive. Using the nurses and corpsmen as sounding boards, the men released tension by recounting their experience. There were descriptions of their futile attempts to defend themselves from behind an icebox or a stove in their outpost home. One told of seeing their beloved medic, caring for four wounded Americans on litters, shot to death along with his four patients. The unit was a closely knit one; each member was concerned for the welfare of the others. Although they were exhausted by long hours of fighting, sleep and rest did not come easily for these men; the need to relive and retell was greater. The nursing care plan for these patients provided much listening time.

Nursing in Saigon includes safe, comfortable movement of patients to treatment centers in other countries, after immediate care and treatment has been given. Once the patient's condition has become stable (for some this could be as long as 7 to 10 days), plans for aeromedical evacuation are made, and transfer from the hospital to the aircraft, a trip of about 30 to 45 minutes, is scheduled. Because of the hospital's limited bed space and the constant input of patients, evacuation is regularly scheduled thrice weekly, with special in-between flights arranged as required. Coordinating the operation is the joint responsibility of Air Force and Navy medical department personnel. Preparation for the transfer of the patient starts in the hospital, where the patient is told about his itinerary and his care during travel. An information sheet tells him what preparation is required. Questions about his personal effects, clothes he will need, care of his valuables, and what he can expect to find at the destination hospital are answered, not only with printed material but also by the nurse and a specially assigned nursing service corpsman. Every attempt is made to allay concern and to make the patient's trip as comfortable and carefree as possible. On the morning of departure the Air Force nurse who will be on the plane calls on

each patient to assess travel needs and to reassure. Then she reviews the nursing care orders with the charge nurse. These orders are a part of the inflight medical orders that go along with each patient.

The Navy nurse's patient may come from any of a number of nations. He may be an Australian, a New Zealander, a Korean, a Filipino; the countries of these are part of the effort in Vietnam. Then there are the Vietnamese people themselves. Terrorist activity is no respecter of age or sex or nationality.

Our hospital is very near the My Canh restaurant. When the restaurant was bombed, the seriously wounded casualties were brought to us, arriving minutes after the disaster. Emergency care was given without question about who victims were. At the triage area, it was evident that many were moribund. Left on their blood-stained litters, these unfortunate persons were gently placed in the far corner of the courtyard, where, attended by hospital corpsmen, they died in peace and dignity under a star-studded sky. The staff's feeling of wanting to do more for them was subordinated to the basic principle of mass casualty care and treatment; doctors and nurses turned their attention to saving the lives of those who could be helped. A futile attempt was made to salvage an unborn baby, whose beautiful young mother had been mortally wounded. In the next room lay her two-and-one-half-year-old daughter close to death from loss of blood. A bomb fragment had pierced the child's upper leg, severing a large blood vessel, as well as fatally penetrating the chest of the Army sergeant who held her in his arms. As a fleeing major rescued the little one, a picture, which was to be carried in papers throughout the world, was taken by an on-the-scene photographer.

Nursing in these crises becomes a matter of taking charge and directing the efforts of others who are willing to help but do not know how, of making independent professional judgments, of effectively guiding nonprofessional personnel in optimum utilization of their nursing skills. It means long hours on duty, caring for as many as possible expediently, safely, and without losing sight of the dignity and worth of each victim and of each worker.

Mass casualty training goes on continuously. The procedures are taught whenever a new staff member reports for duty. Emergency supplies are stored in strategically located points throughout the hospital. After each disaster, the plan is reviewed and criticized by the doctors, nurses, and corpsmen. Changes are made to make mass casualty care more efficient and better organized than it was the time before. The tangible results of effort expended in developing, refining, and upgrading a mass casualty plan gives



personnel a sense of inner security and self-confidence that supports them in time of stress. The Navy nurse has a lead role in this phase of training.

Another face of nursing in Vietnam is the hospital's participation in the people-to-people program. Some have said that it is this program that eventually will overcome strife in Vietnam. It includes the professional teaching done by the doctors and nurses in the local hospitals, the consultation services provided, and the surgery performed on Vietnamese war victims and on Vietnamese children. That last holds particular appeal for the nursing staff.

"Leave it to the Marines" is a well-aged and widely used expression. It has come to have a special meaning for Navy nurses in Vietnam as they shared "Operation Cleft Lip," whereby the Marines of the 1st and 2nd Battalions of the 3rd Regiment, 3rd Marine Division (Danang) have enabled native children to obtain sorely needed surgery to correct facial deformities. The Marine sponsors arranged transportation of the children and the mothers to and from their native villages. The surgery was performed by a plastic surgeon on the hospital staff, who planned for one case each week, as the surgical workload permitted. Each child was hospitalized about seven days. None of the mothers spoke English, so it was necessary to use an interpreter, when available, or more often just pantomime. The mothers "roomed in" and took part in caring for their children. We are convinced that the good response of the children to treatment and nursing procedures stemmed from

this. For instance, a day or two before surgery, the mothers practiced feeding their children with rubber tipped syringes. After surgery, the children rebel less against this feeding technique than as if it were a brand new experience.

We made good use of opportunities for teaching hygiene and sanitation. A few parents had a limited knowledge of basic principles, while others were completely uninformed. But all were interested in the care and well-being of their children, and so were receptive to instruction.

In financing the project, the Marines provided some extra money so that mothers could do some personal shopping in the "big city." Accompanied by a Marine sponsor responsible for getting his charges back to their native village, each child and mother left the hospital dressed in new clothes, the child usually clutching a specially beloved toy, gift of a nurse or corpsman. The mother's thanks were expressed by a squeeze of the nurse's hand and eyes filled with tears of joy as the little group departed for the airfield. Today on the wall at the hospital there hangs a shiny red plaque inscribed with the names of the children. It was presented to the senior medical officer and the members of the hospital staff by the Marines who sponsored "Operation Cleft Lip." What it means to all at the hospital is another "well done" added to many others.

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The opinions expressed in this article are those of the writer and are not to be construed as official or reflecting the views of the Navy Department.

## OCCUPATIONAL MEDICINE SECTION

### AN AMERICAN DILEMMA—THE PERIODIC HEALTH EXAMINATION

*Gordon S. Siegel MD, Washington, D.C., Arch Environ Health 13(3): 292-295, September 1966.*

The periodic health examination (PHE) has been defined as a timely examination, by a physician, customarily including past and present medical history, a "complete" physical, and selected laboratory or special studies.

The concept of PHE, and case for such examination of supposedly well adults, was set forth by an English physician, Horace Dobell, in a monograph published in London in 1861. Gould, an American ophthalmologist, advocated similar examinations in an address before the American Medical Association

in 1900. For the past 50 years, PHE has been widely promoted in the United States by both lay and professional parties.

Reports demonstrate a kindling of interest in the early 1900's and a brisk fire of activity in the 1920's. Judging from the literature, PHE was one of the early casualties of the Great Depression of the 1930's but revived following World War II, undoubtedly due to the recognition of the importance of chronic diseases and revolutionary changes in the scientific practice of medicine.

Wherein lies the dilemma? Webster defines:

Dilemma—1. An argument presenting an antagonist with two or more alternatives, but equally conclusive against him whichever he chooses. 2. A situation involving a choice between equally unsatisfactory alternatives. Synonym: See Predicament.

The American medical and related health professions, vociferously and vigorously, support and encourage the PHE as an excellent, if not the best, weapon in the adult preventive medicine arsenal. American medicine generally touts the concept and value of the PHE, as a means of conserving and improving the personal and public health. Yet, a few physicians are now heard expressing disbelief; many additional physicians act as if they disbelieved.

Witness the utterance of a prominent physician at a recent British medical meeting:

I have never had a medical checkup and have no intention of having one, nor have my family, nor relatives, nor medical friends. Why should we inflict on the long-suffering public what we are not prepared to endure ourselves? . . . Any form of medical checkup must first justify itself in terms of expense and effort involved.

Before this is dismissed as but an illustration of COL Blimpism, we should examine some of the issues and questions raised.

Could it be true that early sickness consultation (ESC), that is, seeing one's physician promptly only when one is, or thinks he is, ill, perhaps coupled with a periodic multiple disease screening program, is a better or equally effective preventive procedure than the PHE as presently conceived and performed?

That there is value in the PHE to improve an individual's health (and when applied en masse, the public health) rests on a series of premises.

#### PHE Value Premises

1. Supposedly well adults have a great many pathologic abnormalities or propensities (disease and predisease conditions).

2. These can be discerned "early" on PHE by a physician.

3. Early recognition can lead to prevention, arrest, reversal, or cure of disease—the promotion of health and well-being—and decreased risk of morbidity and mortality; providing,

4. The patient is receptive and able to follow the correct action and advice made available by the physician.

PHE premises 1 and 2, relating to the presence and findings of disease, have been studied and proved true.

The literature for 40 years reveals that PHE-interested physicians were intrigued with the extent of disease existing in a supposedly well population and paid little attention to premises 3 and 4.

The key PHE premise, number 3, that early discovery of asymptomatic disease or defect can lead to significant health improvement, measurable in some quantitative way, such as increased longevity, reduced morbidity, reduction of days' work loss, invalidism, or hospitalization, is still the subject of hot debate. It sounds reasonable, but is it true?

As to PHE premise 4, it must be said that the American medical and social climate has provided competent physicians, cooperative patients, and adequate facilities and favorable economics for at least a segment of our population. On the other hand, if PHE were to become a general population practice tomorrow, I do not believe we would be able to meet all the conditions of premise 4.

Turning to an examination of the premises supporting the value of early sickness consultation in the dilemma of PHE versus ESC, I found only one report in the entire American medical literature which attempted to study this crucial question.

#### ESC Value Premises

1. It is true that supposedly well individuals harbor a great deal of disease, and these can be discerned by the expensive and professional time-consuming methods of PHE.

2. However, most of the significant silent diseases found today cannot be conclusively favorably manipulated on the basis of present knowledge.

3. Most amenable diseases present symptoms "early enough"; moreover,

4. The relatively few amenable silent diseases can best be discerned by a program of periodic, selective mass screening utilizing automated, refined techniques and social methods (and with relatively little utilization of scarce physician services).

ESC requires a competent physician, a cooperative, educated, and motivated patient, ready access to adequate medical care facilities, and suitable and available screening programs.

A crucial point is the challenge raised to the aphorism "early recognition leads to early treatment and cure." Well and good, if we have available effective treatment; and if it makes significant difference when applied, and if the treatment per se is not more hazardous than permitting a natural course of events. All of these "if's" may sound heretical to modern American medicine, but are worthy of thought in an era where the dictum "first

of all do no harm" has been replaced all too often by "don't just stand there, do something!"

Can we say "scientifically" that early recognition leads to decreased incidence, morbidity, or mortality when dealing with cancer of the female breast, cancer of the lung, chronic respiratory disease, cancer of the cervix, diabetes, heart disease, glaucoma, alcoholism—to name a few of the scourges of our time? For some we can answer "yes," for a few "no," and for too many we must truthfully admit "we don't know."

Time does not so permit discussion and debate of the premises, status of knowledge, and many dilemmas inherent in PHE versus ESC. Instead, I must proffer opinion.

1. Periodic health examination of adults, as originally conceived and as currently practiced, remains—after 50 years of vigorous American promotion—a scientifically unproved preventive medical procedure. We do not have conclusive evidence that populations undergoing PHE live longer, better, healthier, or happier because of it, nor do we have evidence to the contrary.

2. One reason the PHE concept has found favor among American physicians is because it preserves or is concordant with our respectful attitude toward the "personal doctor-patient" relationship. Often verbal favor changes to active opposition when PHE services are delivered via relationships involving examining clinics, industrial medical departments, health centers, health departments, or government.

3. PHE has found favor with the American public because the concept is pleasingly "reasonable," because the public holds the medical profession and their recommendations in high esteem, because we are a wealthy and health conscious nation, and probably because we are all a bit hypochondriacal.

4. I believe that the medical profession and public are both confused as to what to do about and expect from PHE. This results in wastefulness, inefficiency, and undue risk and anxiety for all concerned.

5. The following is currently working against

extension of PHE: (a) increasing specialization within the medical profession, (b) disappearance of the family physician, (c) the growing complexity and cost of PHE, as medical science uncovers more to look for, and more ingenious (and expensive) ways to look for it, and (d) increasing medical care demands on limited professional and technical time and resources.

6. I am in favor of PHE, when it can be conducted in a setting where it can be studied. Periodic health examination can, and should be, one of modern medicine's most valuable experimental tools. It is a tool which will enable us to study the characteristics and determinants—the epidemiology—of the diseases of our time. It can aid us in the treatment and prevention of disease and the promotion of health. For the student of clinical medicine PHE offers an unequalled educational opportunity.

7. I have serious reservations about continuing to promote the PHE publicly, as currently performed, as an effective public health measure. At the very least, if PHE is to be promoted, the content and method should be significantly modified. It may be more practical and valuable, at present, to urge and develop early sickness consultation, coupled with periodic selective multiple disease screening efforts.

8. It is time for a national effort on the part of our profession for a gathering to analyze, discuss, and debate all aspects of PHE (and multiple screening, as well).

A few last words—I have been discouraged by the failure, with but a few notable exceptions, of American medical schools, schools of public health, teaching hospitals, and prominent clinicians to demonstrate interest and research in the periodic health examination. We need answers to our dilemmas—not only because of the untold millions and the precious professional time currently expended, but because we should be able to do more, and do it better, for the health of the American worker. In the field of PHE, as in many others, the men of occupational medicine are emerging as the scholars and leaders in clinical preventive medicine.



## FATAL HYDROGEN SULFIDE INTOXICATION

*Lester Adelson MD and Irving Sunshine PhD, Cleveland, Ohio, Arch Path 81:  
375-380, May 1966.*

Hydrogen sulfide, found widely distributed in nature, is also a by-product of many industrial processes and is produced in large quantities when sulfur-containing, proteinaceous material undergoes putrefaction. It is an important constituent of sewer gas, its specific gravity of 1.192 compared with air favoring its accumulation in such an underground location. Although a wide variety of asphyxiant, irritant, and explosive gases are usually present in this complex miasma, viz, methane, ammonia, carbon monoxide and dioxide, ethylene, sulfur dioxide, phosphine, and others; hydrogen sulfide is probably the major health hazard in this malodorous component of our polluted physical environment.

That hydrogen sulfide is extremely toxic and that it can be as rapidly fatal as hydrogen cyanide usually comes as a shocking surprise to those of us whose most prolonged and intimate contact with this gas stems from its almost daily utilization in the laboratory portion of an undergraduate course in qualitative, inorganic chemical analysis. Although its characteristic "rotten egg" odor is thoroughly familiar, its lethal potentialities are rarely given consideration. Anyone who comes into contact with hydrogen sulfide under any circumstances is well advised to remember that in high concentrations, it is extremely dangerous to life, the more so because its widespread distribution in relatively nontoxic but readily perceptible levels tends to create a disregard for its capacity to kill quickly. A treacherous, anomalous characteristic of hydrogen sulfide, which makes it doubly dangerous, is its ability to precipitate immediate olfactory paralysis when it is present in rapidly lethal concentrations, thus depriving the potential victim of any warning of its presence via his sense of smell. The subjective evaluation of hydrogen sulfide levels by odor is thus perilously inaccurate and completely unreliable. Absence of color is yet another property which permits its accumulation in dangerous quantities without visually alerting prospective casualties of impending disaster.

This communication deals with the anatomic and other laboratory findings in three young men who died from hydrogen sulfide intoxication following their descent into a sewer. An unusual and striking

color change involving the blood and viscera, especially the brain, is illustrated, and some of the biochemical and toxicological aspects of hydrogen sulfide poisoning are discussed.

### Report of Cases

**The Incident**—A 35-year-old employee of the State Highway Department collapsed a "minute or two" after having descended via a ladder into a 15-ft-deep sewer to collect samples of water for analysis. When he failed to respond to his name, called out by several fellow workers who had remained at the manhole entrance, two of them immediately went down into the sewer while a third ran to their truck and procured a length of rope which he lowered into the opening. The two would-be rescuers attempted to tie the rope around the original victim and then hastened to ascend the ladder because the "gas was getting to them" when both dropped in their tracks within a few seconds of one another. By this time a crowd had gathered in response to cries for help, and yet another man began to descend the ladder. He got only halfway down before he hurriedly scrambled back to the surface, stating that he had almost lost consciousness. A workman from a nearby project, wearing some kind of protective mask, then entered the sewer after fastening a rope around himself. He tied the rope around one of the three men, helped bring him to the surface, and then went down again and did the same for a second victim. After reentering the sewer for the third time to help remove the last man, he was overcome himself and had to be hauled to the surface. By this time the rescue squad had arrived, and a fireman wearing an oxygen mask climbed down into the sewer and was successful in bringing the last of the three original victims to the ground surface. None of the three Highway Department men responded to vigorous resuscitation, and all were pronounced dead on arrival at a nearby hospital. The two-rescuer-victims recovered rapidly and showed no apparent aftereffects.

An inspector, who arrived on the scene some three hours after the accident, noted the presence of a "terrific odor," and other observers, familiar with

the area, told him that a "strong odor" emanated from that particular sewer from time to time. Significantly, eight days prior to the fatal incident, one of the three men who had been killed had spent about 45 minutes exploring in this same sewer without suffering any discomfort or ill effects; and a few days later several workmen had stood over the open manhole and had not been aware of any unpleasant odors or other indications of potential danger.

Environmental Study—Investigation by the State Division of Mines of the sewer where the triple fatality occurred and of the surrounding neighborhood disclosed that a factory, which converted fish oil and crude petroleum oil into gear lubricant, produced and discharged into the sewer approximately 500 pounds of hydrogen sulfide every 36 hours, the gas being formed as a by-product of the manufacturing process.

The gas was usually dissolved in water in a safe ratio of 1:2,000 and was flushed into the sewer from a scrubber at the rate of 200 gallons of wash water per minute. On the day before the fatal exposures occurred, a fire hydrant in the vicinity had been accidentally damaged, and this mishap resulted in a decrease in the water pressure to the factory (and neighborhood generally) over a period of several hours, followed by a complete shutoff of water for about 2½ hours while the damaged hydrant was being repaired. It is probable that this mishap unbalanced the sulfide disposal process and

upset the usual gas-water ratio, resulting in a much higher concentration of hydrogen sulfide. The excess gas could then be released, either as a result of the churning turbulence of the water, or more probably because of the presence of some acid discharged into the same sewer from some other industrial plant. The end result would be a lethal concentration of hydrogen sulfide in the ambient underground atmosphere.

#### Comment

Finally, this triple tragedy indicates in most impressive fashion the necessity of observing all safety precautions when one is dealing with known or possible exposure to hydrogen sulfide in any working atmosphere. These protective measures include the mandatory use of protective masks and safety belts before entering any room, sewer, enclosure, or other site where this dangerous gas may be present in potentially toxic concentration. Inasmuch as that gas is quite soluble in water and other fluids, it can be carried for considerable distances from its place of origin before it escapes at some unexpected site. Repeated analyses for its presence and concentration must be made along the course of flow at frequent intervals to exclude its appearance after having previously established its absence. In dealing with hydrogen sulfide, it is literally vital to keep uppermost in one's mind the proposition that familiarity can breed a contempt which can be instantly fatal.

## EDITOR'S SECTION

### AMERICAN BOARD OF OB-GYN

*Applications to take Part II* (oral) examination November 6–10, 1967 will be accepted in the office of the Secretary during January and February, 1967. Those applications postmarked after February 28th will not be acted upon in 1967. All Part II applications must be accompanied by duplicate lists of patients dismissed from candidates' service during the twelve months immediately preceding the month of application. A sample format to be followed in the listing of patients is enclosed in each application form.

Application forms and Bulletins may be obtained by writing to the office of the Secretary, Clyde L. Randall MD, 100 Meadow Road, Buffalo, New York 14216. Prospective candidates are urged to review

the current Bulletin of the Board for complete information on the requirements for application.

Diplomates and candidates are requested to keep the Board office advised of their current address.

### USS PRINCETON PIONEERS "ONE-STOP MEDICINE"

Aboard the USS Princeton at Long Beach, Sept. 3—A new concept in combat medicine has come into its own. It is known as "one-stop medicine," and it is entirely the product of the amphibious assault carrier.

The USS Princeton, which returned to Long Beach September 2 after six and one half months in the coastal waters of Vietnam, is one such carrier to exploit its capabilities as a medical facility.

Princeton's secret is close coordination between all the departments involved. Helicopters based on the ship, after landing Marines in the battle zone, supply them with ammunition, food, and equipment during the ensuing action. As casualties occur the helicopters are close at hand to speed them to expert medical care. Once back in the carrier's flight deck, a medical evacuee is placed on an elevator which delivers him to a waiting doctor in a matter of seconds. LT Morris D. Kerstein MC USNR, has reported an elapsed time of only nine minutes from the time of wounding to the operating table in one instance.

"It's like having a hospital at your grocery store," says LT Nicholas Kleha MC USNR, the other medical officer aboard Princeton. "The helicopters have to return to the ship for supplies and fuel anyway. Now they save lives directly with every trip."

Princeton has as its primary mission the assault phase of an amphibious operation. The Marine landing force embarked on the ship is landed by helicopter in strategic areas, often behind enemy lines. The ship then serves as an intelligence center, supply center, and—in effect—a complete military base.

The medical facilities are only a secondary function. Nevertheless, Princeton's sick bay is as versatile and complete as many modern hospitals.

In addition, a team of surgeons and medical specialists is assigned to the Princeton whenever she is designated a medical evacuation ship. This team is composed of senior surgeons from various United States Naval Hospitals throughout the United States.

Not only did Princeton's medical department and the special surgical team handle a record 750 casualties during her deployment, but her crew also served as a "walking blood bank." Princeton's 1200-man crew donated over 400 pints of blood for use in operating rooms of ships in the South China Sea.

Among the most interesting journals returning with the Princeton is one kept by the two medical officers. In it, one patient, a member of Marine Battalion Three, Fifth Marines, is reported who was wounded in the abdomen by an enemy bullet. When the enemy Viet Cong searched the area, they insured the thoroughness of their work by bayoneting all the wounded and dead Marines in the area. The patient in question watched his buddies stabbed, heard many of them cry out, as the Viet Cong shot those who showed any sign of life.

When they came to him, the Marine made no movement. When he was bayoneted in the shoulder, he made neither audible sound or perceptible movement. He was left for dead.

Twenty-four hours later, when found by a helicopter from the Princeton, the man was brought to Princeton's operating room.

The man underwent surgery, was placed in intensive care ward, and was back on his feet—fit for duty—in 6 weeks.

Another Marine, in the same regiment, had both legs amputated after a mine was detonated under his feet. Because of the availability of helicopters and the Princeton's complete medical facilities, the injury was not fatal. In fact, thirty days later the Princeton medical team received a letter of gratitude from the man as he walked out of Oak Knoll Naval Hospital in Oakland, California, on a new set of artificial limbs.

Battle casualties are not limited to fighting Marines. Medical corpsmen also are wounded in the field while serving others.

One such corpsman was wounded in the left kidney. Returned at once to the Princeton, the man underwent surgery and was placed in the postoperative recovery ward. Four days later, when a doctor found him up and around caring for other wounded patients, he was ordered to return to his bed.

"I can't sir," was the reply. "This is my job."

There are scores of such stories. They are all the same. A man should have been dead, but because of the helicopters in the area and the USS Princeton just off-shore, his life was saved.

Princeton's commanding officer, CAPT Tazewell T. Shepard, Jr., is particularly proud of his medical department. "They've done an outstanding job," he comments. "It's gratifying to know that their skill and quick action saved the lives and has hastened the recovery of many Marines and Sailors." \*

#### BUDDY-AID TRAINING FOR THE FLEET MARINE FORCE

*By CAPT Paul E. Black MC USN, U.S. Naval Air Station, Lakehurst, New Jersey.*

At my last duty station, one of the most important teaching requirements was to prepare Fleet Marine Force personnel to handle casualties. One of the basic concepts in this was that either in a war involving nuclear weapons, where mass casualties can be expected, or in guerilla warfare conditions it is unlikely that there will be sufficient medical personnel to handle the casualties. The familiar cry of the past, "Doc" or "Corpsman," will be replaced by "Buddy!"

\* This Navy News Release, edited slightly, was sent to the U.S. Navy Medical News Letter by Michael A. Goodman, LT (jg) USNR, Public Affairs Officer on the USS Princeton, LPH-5.—Editor.



With the foregoing in mind, we planned and tried a series of training sessions in casualty handling. Because of the large number of men to be trained, we decided to use mass education methods—including lectures, movies, and demonstrations. We hoped that the weaknesses of these methods for teaching the skills involved in casualty care could be overcome by thorough and extensive presentations.

Large groups of Marines were assembled in the station theater. There we gave lectures and presented movies on first aid, battle casualties, and advanced medical techniques, and demonstrated the proper care and handling of the injured.

After this training schedule had been in effect for six months, however, the field tests which we conducted revealed that too many of the men were not learning what we were trying to teach them.

In these tests, we sent patrols of trainees into areas where they would come unexpectedly upon "casualties" (men with moulage facsimile wounds representing various types of injuries). When confronted with casualties, many trainees did nothing at all. And too few of those who did make an attempt at treatment (usually only after being pressured by their NCO's) used the correct methods.

These results clearly indicated that a more effective approach was necessary if our "Buddy-Aid" training techniques were to be successful. Consequently, we discarded our mass education methods and adopted a new training plan.

Classes were reduced to 40 men in this revised program. Of these, 10 were designated as "casualties" and donned the moulages; each of the 10 represented a major problem in casualty treatment. The remaining men in the class were divided into ten 3-man groups so that there was one group per casualty. A Hospital Corpsman, who had been through a refresher course in casualty handling, was assigned to observe each group.

In the first phase of the new program, attention was directed toward perfecting the skills of those who had made acceptable progress and motivating those who had not. It was a trial-and-error phase in that the trainees were told to handle the casualty the best they knew how; the HM was there mainly to note errors in treatment and was to assist a trainee only if he were using the correct method (but making minor errors in the process). This procedure impressed the trainee with the importance of knowing thoroughly the techniques required in treating a casualty, and motivated him to listen and observe carefully during the subsequent instructional periods. After each man in a 3-man group had had his chance at treating a particular type of casualty, the group moved on to

another type where the process was repeated. Eventually, each trainee had treated all of the 10 different casualties.

The next phase was to assemble all 40 men in a classroom where they were lectured on the proper method of handling each of the casualties they had encountered. The proper techniques of treating these then were demonstrated on a manniken, using the moulages. Errors that had been observed in their treatment of the "wounded" in the first phase were corrected and the proper methods demonstrated. Questions were answered, and obscure points were clarified. These sessions were held over a period of several weeks.

The final phase was to test the trainees on their skill in Buddy-Aid. Various Marines were selected at random and confronted with a "casualty." The results, as contrasted with those at the end of the initial training program, were most gratifying. The men now approached the problems with confidence and handled each condition in an exemplary manner. Their performance proved completely the effectiveness of our second training effort. And further, it furnished men qualified to answer the cry of "Buddy!" with skilled first aid assistance in the event of actual mass casualties.—Naval Training Bulletin, Summer 1966.

#### NAVY CORPSMAN IS A GOOD WILL DISPENSER

Chu Lai, Vietnam—Hospitalman First Class Thomas M. Hughey, USN, an automatic dispenser of good will, is literally known as a "jack of all trades" by his comrades stationed in Vietnam.

He is a doctor, lawyer, merchant, mechanic, politician, business manager and perhaps most important, education fund-raiser for the villagers of Long Phu #1, Vietnam.

Under his guidance the village has become a prosperous example of American-Vietnamese good will.

The 33-year-old Akron, Ohio corpsman, civil affairs representative for the 2nd Bn., Seventh Marine Regiment, 1st Marine Division, recently topped his good will drive by collecting enough money to pay for the education of 120 children.

He called his campaign "Cokes for the kids."

Realizing that more than half the children of Long Phu #1, a village within the battalion's civil affairs responsibility, would be unable to attend school because of the high educational cost, he kicked off a drive to sell cokes for 25 cents. The proceeds, the Vietnamese equivalent of 300 American dollars, went to the childrens' education fund.

On the first day of school following summer vacation, LCOL John J. Roothoff of Salt Lake City, Utah, battalion commander; MAJ Roy E. Moss of Camp Pendleton, California, and Hughey delivered the fund to the village officials and children who had gathered in front of the schoolhouse.

Following the presentation ceremonies, a Vietnamese flag was donated to the school by the Marines. Hughey then distributed CARE school kits and other items purchased with extra "Cokes for the kids" proceeds.

In addition to watching over the education of his charges, Hughey also oversees the daily medical care program conducted by battalion corpsmen. He procures supplies for new dispensaries, wells and showers the villagers build. He has also initiated a well-organized softball team, and conducts hygiene classes.

But this isn't all. Hughey has another village, Long Phu #2, with which he's concerned.

"As soon as we can get another program going," said Hughey, "we'll have another Coke drive to pay for our village children's education. Leaving behind educated children will be one of our most important victories in this war."—NAVNEWS, Navy Department, Washington, D.C.

#### CAPT GRAYBIEL TO RECEIVE SUSTAINING MEMBERSHIP AWARD

CAPT Ashton Graybiel MC USN (Ret), will receive the Sustaining Membership Award at the 73rd Annual Meeting of the Association of Military Surgeons of the United States to be held at the Washington Hilton Hotel, November 7-9, 1966.

This award, established in 1958 by action of the Sustaining Members of the Association, is presented annually to an individual in one of the Federal Medical Services who has made some outstanding contribution in the field of medical research. The award consists of a scroll and a \$500.00 honorarium.

Dr. Graybiel will receive this award for his original research which has contributed towards the solution of a challenging problem in Aerospace Medicine. One of the most challenging problems in aerospace medicine is the disorientation associated with functional disturbances having their origin in the semi-circular canal and otolith organs when man is exposed to the unusual force environments which may be encountered in aviation and in the exploration of space. CAPT Graybiel has been a principal investigator in vestibular physiology for several years and has authored several articles published in Aerospace Medicine. Earlier work in this field contributed

to the prevention of accidents due to vertigo in terms of physiological and psychological mechanisms. His definition of factors and mechanisms made possible positive measures to greatly reduce the hazards of vertigo in aviation. More recent work has been concerned with the symptomatology and underlying mechanisms in different force environments, particularly subgravity states and constant rotation (coriolis force).

Dr. Graybiel was born in Port Huron, Michigan, received degrees of AB and AM from the University of Southern California, and his MD from Harvard Medical School. Dr. Graybiel served as Director of Research at U.S. Naval Aerospace Medical Institute, Pensacola, Florida, from 1945 until his retirement from the Navy on 30 June 1966. Presently, he is the Civilian Director of Aerospace Research at the Naval Aerospace Medical Institute.—Association of Military Surgeons of the United States, Washington, D.C.

#### NATIONAL ASSOCIATION OF MILITARY SURGEONS, NATIONAL GUARD OF THE UNITED STATES

The following article appeared in the JAMA 75 years ago and is reprinted here from the JAMA 197 (13): 26, Sept 26, 1966, copyright 1966, by American Medical Association.

We have the pleasure of welcoming another National organization of medical men. The medical officers of the militia of the several States have during the past few years grown into the habit of forming State societies among themselves. But it occurred to Prof. Nicholas Senn, Surgeon-General of Wisconsin, that the time had come to unite the medical officers of the militia into a National Organization. Accordingly, on his call, representatives from sixteen States met in Chicago September 18, for organization. In the morning the gentlemen attended a brilliant clinic, held by Prof. Senn, at the Presbyterian Hospital, a gunshot wound very properly forming the subject-matter of the clinic. At noon, to the number of sixty, at the Union Club, they sat down to a delightful lunch, tendered them by the Faculty of the Chicago Policlinic, after which they marched, as befitted their military character, to the Chicago Policlinic, whose handsome amphitheatre, appropriately decorated, became the theatre of their deliberations. In the evening, Prof. Senn's residence was the scene of a brilliant reception given in honor of the military guests.

All organizations of medical men are beneficial to the profession. In addition, each special organization has its special uses. The advantages arising from the

present organization are peculiarly its own, and it will secure improvements which can be obtained through no other channels. The *personnel* of the militia surgeons has, in the past, been too closely connected with politics to be above reproach. Such a state of affairs will be largely corrected through this organization, for it will attract to itself only the competent men of the service. It will foster the study of military surgery, altogether too much neglected. It will emphasize the importance of the medical art to the State.

#### EDITOR'S NOTES

Several recent articles about portasystemic shunts are worth reading:

Clinical Comparison of End-to-Side and Side-to-Side Portacaval Shunt, T. B. Reynolds MD, N. M. Hudson MD, W. P. Mikkelsen MD, F. L. Turill MD, and A. G. Redeker MD, *New Eng J Med* 274:706-710, Mar 31, 1966.

The Present Status of Shunts for Portal Hypertension in Cirrhosis, N. D. Grace MD, H. Muench MD, and T. C. Chalmes MD, *Gastroenterology* 50: 684-691, May 1966.

Hemochromatosis Associated with End-to-Side Portacaval Anastomosis, N. D. Grace MD and J. A. Balint MB MRCP, *Amer J Dig Dis* 11:351-358, May 1966.

Portasystemic Shunts in 102 Patients with Portal Hypertension, C. E. Sedwick MD, J. K. Poulantzas

MD, and W. H. Miller MD, *New Eng J Med* 274: 1290-1293, June 9, 1966.

Selection of Patients for Portal-Systemic Shunts, R. E. Hermann MD, A. D. Rodriguez MD, and L. J. McCormack MD, *JAMA* 196: 1039-1044, June 20, 1966.

Surgical Treatment of Portal Hypertension—Long-Term Results, W. P. Longmire, Jr., *Curr Probl Surg* (Year Book Medical Publishers, Inc., Chicago) pp 78-88, July 1966.

Retrograde Venous Circulation and Portacaval Anastomosis, B. A. Petrov and L. L. Gugushvili, *Surgery* 60: 373-378, August 1966.

Management of Portal Hypertension and its Consequences, Sheila Sherlock MD, *Disease-a-Month* (Year Book Medical Publishers, Inc., Chicago), March 1966.

Massive Hepatic Necrosis Following Portacaval Shunt, L. C. Koenemann MD and L. Ceballos MD, *JAMA* 198: 138-142, October 10, 1966.

The Edgecombe Lecture, "Complicated Rheumatoid Disease" (in this issue of the News Letter), is given yearly in honor of Dr. Wilfred Edgecombe FRCS FRCP, an eminent rheumatologist in Harrogate, Yorkshire who died a few years ago. The Editor of the British Medical Journal discussed this paper in the section, "Leading Articles" in the *Brit Med J* (II): 131-135, July 16, 1966, particularly the complications of therapy and adds Sjögren's syndrome and disease of the atlanto-axial joint as complications of rheumatoid disease.



## In Memoriam .

RADM William M. Burns, DC, USNR, (Ret)	28	July	1966
RADM Everett B. Keck, MC, USN, (Ret)	24	April	1966
RADM Lea B. Sartin, MC, USN, (Ret)	13	Mar	1966
RADM Joel J. White, MC, USN, (Ret)	31	Jan	1966
CAPT Robert Alexander Bell, MC, USN, (Ret)	26	June	1966
CAPT John T. Bennett, MC, USN, (Ret)	28	Sept	1966
CAPT Harold J. Chapman, MC, USN, (Ret)	8	Sept	1966
CAPT Edward L. DeWilton, MC, USN	6	Nov	1965
CAPT Frank Davenport Fuller, MC, USN	5	Sept	1966
LCDR Ralph W. Goerner, MSC, USN	14	Oct	1966
CAPT John J. Goller, MC, USN, (Ret)	30	Oct	1965
CAPT John S. Hanten, MC, USN, (Ret)	1	Oct	1965
CAPT Harry Equilla Jenkins, MC, USN, (Ret)	28	May	1966
CAPT John B. Kaufman, MC, USN, (Ret)	13	Sept	1965
CAPT Harry A. Keener, MC, USN, (Ret)	23	Oct	1965
CAPT Herbert L. Kelley, MC, USN, (Ret)	14	Nov	1965
CAPT George J. Kohut, MC, USN, (Ret)	8	Mar	1966
CAPT Jerome P. Long, MC, USN, (Ret)	10	Oct	1965
CAPT Maurice S. Mathis, MC, USN, (Ret)	14	Feb	1966
CAPT James B. Pettis, MC, USNR, (Ret)	8	Oct	1965
CAPT Willard J. Riddick, MC, USN, (Ret)	25	Mar	1966
CAPT Louis M. Smith, MC, USN, (Ret)	30	Sept	1966
CDR Walter R. Cox, MSC, USN, (Ret)	11	July	1966
CDR Robert S. Kibler, MC, USN, (Ret)	5	July	1966
CDR Irving J. Warmolts, MC, USN, (Ret)	8	July	1966
LCDR Margaret O'Connor, NC, USN	18	April	1966
LCDR Carl John Stommel, MSC, USN, (Ret)	20	Mar	1966
LT Nenad F. Buktenica, MC, USNR	29	Sept	1966
LT William J. Coats, MSC, USN, (Ret)	9	Oct	1966
LT James H. Covey, MC, USN	3	Oct	1966
LT Kenneth R. McPherson, MC, USNR	14	Feb	1966
LT Willis E. Sullivan, MC, USN, (Ret)	8	June	1966
CMSW (CWO-2) Roy Whitehurst, USN, (Ret)	4	Aug	1966

# IMPORTANT NOTICE

## U.S. NAVY MEDICAL NEWS LETTER RENEWAL REQUEST IS REQUIRED

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